MODEL AIRPLANE NEWS

NOVEMBER, 1938
20¢

10th Year of Publication

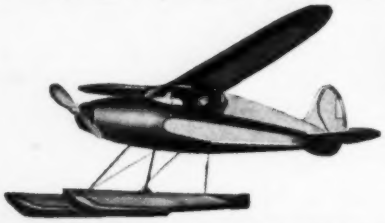
The Messerschmitt BF-109 Fighter

(See Page 35)

The finest in model craft....

True Creations in design! These two extra-fine detailed craft are masterpieces in construction. It's our guess that you have never seen planes so perfectly detailed, nor sets so complete. Look for them at your dealer's.

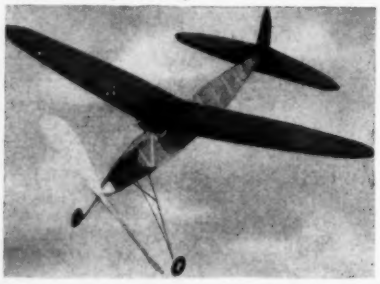
PROVEN CHAMPIONS!!



DICK KORDA'S WORLD RECORD HOLDER. 43" wingspan

A PROVEN CHAMPION. The only commercial set being made of a model, which in actual competition, established a record so far ahead that in two years no model builder has come within twenty minutes flying time. It's a model any beginner can make and be sure of real flying satisfaction. Get yours today!

Only $1.00 P.P.



SKEETER

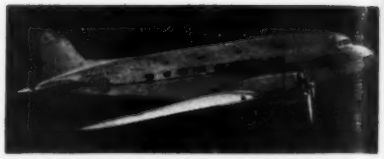
Balmy summer skies are now giving way to crisp autumn winds. Stay right in step with the changing temperature. Get this powerful flying "SKEETER" which can be converted to skis, wheels, or floats in a minute. The set is complete and easy to build. See one at your dealer's.

Only $1.00 P.P.

THE 30" THERMALIDER

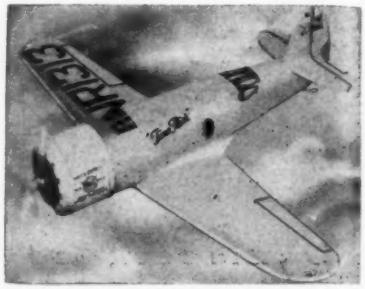
More beginners have had successful flying with this model than any other ever produced. It was made for you fellows who, time after time, have been unable to get the flying you wanted. Don't be discouraged because of unfortunate results with poor designs or incomplete sets. Get this sure fire flyer NOW!

← Only 50c P. P.



36" DOUGLAS SLEEPER TRANSPORT $2.00

This luxurious liner is the latest development in skyway airline equipment. The set is a true and exact replica ABSOLUTELY COMPLETE with controls operating from the cockpit, retractable landing gear, all colored dopes, ready shaped nose cowls, and many other distinctive features.



36" FRANK HAWKS' "TIME FLIES" $2.00

The last and finest speed crate that Frank Hawks built and flew. Said to be the fastest land plane in the world, it was a fitting tribute to a heroic figure. Burd has the only accurate set in existence for this job and it's a honey. Get yours now!

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a 5 FOOT *wingspan* ONLY $1.50

Big, powerful flyers that must give you satisfaction. Get one of these easy to build master flyers and be the envy of every boy in your neighborhood. These are giants in value, size and performance.

REARWIN SPEEDSTER

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Only $1.50 P.P.

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A HURRAH FOR CORRIGAN! But let's not forget the trusty old "Robin" that he flew. Tried and true for a decade this "crate" has stood out as one of the finest built and designed planes that ever left a factory. For non-stop flights get this AT ONCE.

Only $1.50 P.P.

FAIRCHILD '24'

A strong, rugged flyer under all conditions. It's an 'easy to build' model, complete in every respect. Set includes as an extra, added feature, a turned nose front. For real flying build this job!

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BUY FROM 'BURD'. GET GUARANTEED DELIVERIES ON GAS MOTORS!!

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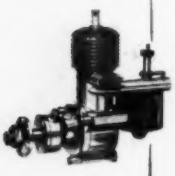
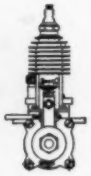


1/5 h.p. $18.50
1/7 h.p. 16.50

SYNCRO'S



1/5 h.p. $13.75
1/7 h.p. 12.50

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Model D	$10.00
Model M	15.00
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Model B	21.50

Mighty Midget Upright finished		$ 9.50	kit $7.85
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Gwin Aero Inverted finished		12.50	kit 9.85
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9", 10¾", and 12" diam. ea. $.75
13" and 14" diam. ..... ea. 1.00

Selected Balsa or Aircraft Spruce (5 ft. lengths in strips)

1/8x1/8	ea.	.03
1/8x1/2	ea.	.04
3/16x3/16	ea.	.04
1/4x1/4	ea.	.08
1/4x1/2	ea.	.08
1/4x1	ea.	.12
1/2x3/4	ea.	.14

(3 ft. lengths in sheets. Double these prices if desired in 5 ft. lengths.)

1/16x3	ea.	.08
3/32x3	ea.	.08
1/8x3	ea.	.12
3/16x3	ea.	.08
3/32x3	ea.	.09
1/8x3	ea.	.12
3/16x3	ea.	.14
1/4x3	ea.	.17

M & M Wheels per pr.
Up to 1⅝" ..... .50
1⅝" to 2⅝" ..... .60
3½" diam. 1.50
3½ or 4½ 2.75

Cement, clear dope, thinner, and any color dope, 2 ozs., .15; ½ pt., .40; 1 pt., .75.

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3/32 or ⅛ diam, .10
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50 INCH WINGSPAN Now $1.00 P.P.

CURTISS HAWK P8E

A value that far surpasses any you have ever seen. BIG in all respects this model is still easy to build. Get one TO-DAY!

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50" AERONCA K

A simple model of one of the latest low price flying jobs. It's simple to build and makes a strong rugged flyer.

Now $1.00 P.P.

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A low wing flyer that's a "honey". This model is easy to build and really flys. It's close to scale and the set is complete—no SKIMPING. See it at your dealer's to-day.

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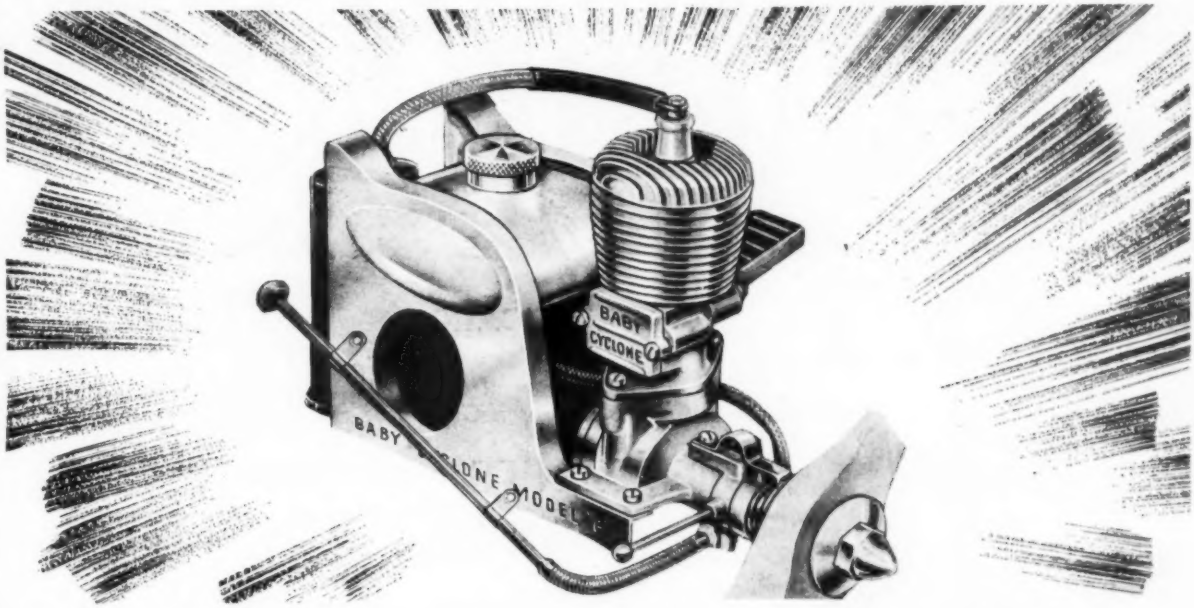

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TEMPORARILY
Your Price
1938 BABY CYCLONE Model "F"

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Complete and assembled with coil, condenser, drawn steel engine mount, integral gas tank, remote control throttle, exhaust manifold and can of lubricating oil. Postage prepaid in the U.S.A. Price in all foreign countries $18 for the duration of this offer.

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"CYCLONE SERVICE" ⟶ Your engine positively will be shipped on same day your order is received

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SHIP TO _____ Age ____ ADDRESS _____

N-11

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Model AIRPLANE News

10th YEAR OF PUBLICATION

VOL. XIX *No. 5*

Edited by Charles Hampson Grant

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NEW LOCKHEED ARMY SPEED VEGA

30¼" Span, Length 21", Weight 3 oz.—Scale ¾", Color Blue and Yellow.

This model with its bullet-like body and high lift type wing is one of our best flyers and most stable. It is handsome to look at and very strong. Const. Set contains all parts printed on balsa, a 3-3/16" turned balsa motor front, 9" carved hardwood propeller steel type shown, colored insignia, rubber motor, celluloid, wire, complete set of colored paints, glue, etc., special wheels, tail wheel, full size scale drawings, and all parts to build as shown. CONST. SET COMPLETE in labeled gift box, postpaid $2.95

CONST. SET, 41" Span, 1" Scale. Larger model of same plane $4.95

BOEING F4B4 NAVY FIGHTER

SOLID EXHIBITION MODEL

22½" Span, Length 14½"; Color Grey, etc.

This is the finest solid exhibition model ever produced. Set contains completely finished balsa fuselage, with cockpit cut out, motor hole cut out and headrest attached; all you have to do is paint it. The wings, tail and rudder are all cut to shape, but have to be sanded to proper curve. A 3" celluloid motor with aluminum motor front, 3¼" tapered aluminum cowl, 7" scale chromium plated propeller, 4 cast bombs, 2 celluloid wheels, tail wheel, complete set of colored paints, glue, filler and all other parts with full size drawing. Set, postpaid $4.50

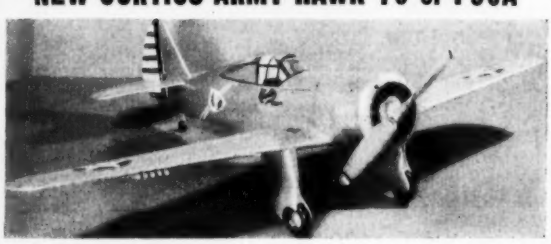
LOCKHEED ELECTRA EXHIBITION MODEL

27½" Span, Length 19½", Scale ½"

Plans approved authentic by Lockheed Aircraft Corp. This is a De Luxe model with special equipment. Set includes two 2" celluloid motors, aluminum motor fronts, two 2" aluminum cowls, two 4" three-bladed aluminum props, two 1½" M & M pneumatic air wheels, all parts printed on balsa, set of colored paints, glue, etc. This is the finest transport model made. Set, postpaid $4.50

Standard Set No. 2, same as above without special equipment. Flying model type. Set, postpaid $2.95

NEW CURTISS ARMY HAWK 75 or P36A



37" Span, Length 27", Scale 1"; Color, silver

An exact scale model of one of the 210 planes of this type ordered by the U.S. Army. Const. set contains a 4" turned balsa motor front, 10" prop shown, insignia, alum. wheels, set of colored paints, all parts printed on balsa, full size large scale drawing, and all parts to build as shown. Set, postpaid $3.25

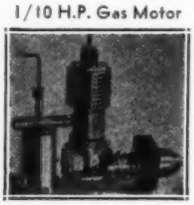
De Luxe set, same as above, but with 4" celluloid and aluminum cowl, postpaid $4.00

1/5 H.P. Gas Motor

⅞" Bore—1" Stroke

Motor comes ready to run with coil and condenser. For 5 to 8 ft. models. Price, postpaid $10.00

1/10 H.P. Gas Motor



17/32" Bore—⅝" Stroke

One of the finest and most compact of the midget motors. Can be used to fly our 41" Vega Model. Price with coil and condenser, ready to run $16.50

20-PAGE CATALOG 10c

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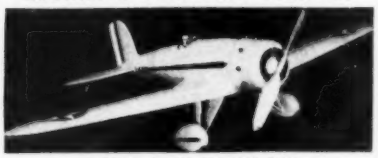
On orders sent to west of Miss., Canada, foreign, or west coast, add 20c postage.

CURTISS NAVY HAWK F11C4

28" Span. Length 20½". 1" Scale

Finest equipped model in the world. Set has 4" celluloid motor, 4" cowl, set of paints, and full size drawing. Postpaid $4.50

LOCKHEED P23A NAVY FIGHTER



32" Span. Length 21". ¾" Scale

Land and seaplane with floats. Set complete with paints and all parts to build land or seaplane. Postpaid $2.95

NORTHROP A-17 ARMY FIGHTER

24" Span. Length 17". ¾" Scale

Set has 7" prop, turned motor front, wooden wheels and complete set of paints. Postpaid $2.50

BOEING F4B4 NAVY FIGHTER

22½" Span. Length 14½". ¾" Scale

Set has 3" celluloid motor, 3¼" tapered aluminum cowl ring, set of paints, etc. Postpaid $2.95

BOEING P26A ARMY PURSUIT

22" Span. Length 17½". ¾" Scale

Set has 3" celluloid motor, 3¼" tapered aluminum cowl ring, paints, etc. Postpaid $2.75

STEARMAN PT13 ARMY TRAINER

18" Span. Weight 1½ oz.

Set has 2" celluloid motor, 6" steel type prop, set of colored paints, full size scale plan. Postpaid $1.50

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30¼" Lockheed Speed Vega	$20.00
32" Lockheed P 23 A	20.00
27½" Lockheed Electra	22.00
22½" Boeing F 4 B 4	18.00
28" Curtiss Hawk F 11 C 4	22.00
37" Curtiss Hawk "75"	22.00
24" Northrop A 17	18.00
22" Boeing P 26 A	15.00

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ACHIEVEMENT

The great Douglas DC-4 (weight 65,000 lbs.) leaving the ground for the first time, as seen by the entire Curtiss-Wright Tech student body. Note tricycle landing gear.

MORE CURTISS-WRIGHT TECH GRADUATES WORKED ON THE DC-4

than those of any other school. Curtiss-Wright Tech does not guarantee positions for its graduates—no reputable school would—BUT

Mr. Donald Douglas

PRESIDENT OF THE DOUGLAS AIRCRAFT CO., SANTA MONICA, CALIFORNIA

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No higher compliment can be paid Curtiss-Wright Tech and its graduates —nor is there any higher authority than Mr. Douglas.

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Attention, Major C. C. Moseley, President

Sir: Without obligation please send me catalog and information on the courses I have checked.

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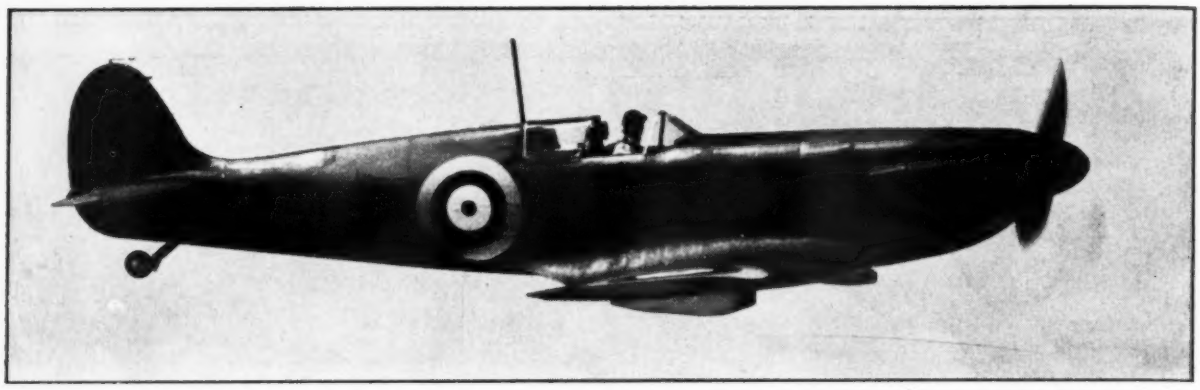


A production "Spitfire" undergoing its trials, powered with the 1,050 hp. Rolls Royce "Merlin" engine. (Monkmeyer)

The Mass Production of Flying Forces

Problems Involved in Mass Production Programs and How They Have Been Solved by Various Nations

By WILLIAM BOYLHART Jr.

THERE will always be the present question of production of airmen and aircraft in the event of war. The peace time air force of any nation is merely a skeletonized unit. It is only considered as a "first line" force; one to be thrown into the breach of offense or defense until such a time as reserves and replacements can be produced to enlarge it. Naturally, this replacement of personnel and machines under wartime conditions must be a rapid process, and one which will successfully function at very short notice. The expending of aircraft and pilots through enemy bombing, air combat and accidental crashes makes wartime air force production of utmost importance.

A squadron of Messerschmitt BF-109 fighters ready to take off from a German air field. (Acme)

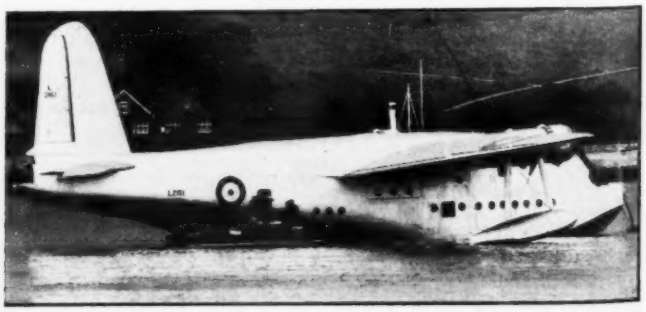
At the present time the solving of this problem of air force production, under the stress of war, is being attempted by European nations. The past war and its attendant unpreparedness have taught many lessons; not only to the United States, but also to Europe. The United States will have no cause for concern with the production of military machines under wartime conditions, for there are collected in this country a large number of the most advanced type of military aircraft factories in the world. These factories would be capable, after reorganization to meet wartime needs, of greater production on a higher level than any of the European nations. In addition, the materials needed in the manufacture of aircraft are available in huger quantities in the United States; whereas, they are decidedly limited in the smaller and less productive countries which Europe consists of.

Incidentally, the present war in Spain is one in which both sides have few production problems. All the war materials, including both airmen and aircraft, are imported from a production point outside the country. An attempt at a blockade has been to some extent successful, but it must be realized that a real blockade would soon end this type of war, due to the exhaustion of war materials.

Other nations have followed the example of the United States in the establishment of government training fields, such as Randolph and Pensacola fields. However, some European nations, especially Germany, have gone even further in their air force expansion programs and have taken their youth as a whole, into the training program. This system will be detailed later.

Germany has shown the greatest pro-

The Gloster "Gauntlet," single-seat day and night fighter which is now in production in England



The "Sunderland," flagship of Britain's new fleet of flying dreadnaughts, with a cruising range of 3000 miles

A production system is being developed by building these transports, that may be applied to military planes

German youth sailplaning at the Wasserkuppe; part of the German air program

duction ability of all the nations, and her organization and planning show great foresight. A great part of her experience was gained during the World War. The following figures on the expansion of the German Air Force between the years 1914 and 1918 show clearly the great possibilities of wartime expansion.

In 1914 there were: Forty-one flying sections, six planes per section; seventy-seven home squadrons; five hundred men in the personnel of the air force; and two hundred and eighteen serviceable aircraft.

In comparison in 1918, there were: four hundred and fifty squadrons; nine planes per scout squadron, and eighteen planes per other duty squadron; one hundred and three home squadrons; five thousand pilots and observers, eighty thousand ground personnel, five thousand cadets in training, and forty-eight thousand aircraft workmen in fifty-three factories, and, five thousand serviceable aircraft. The performance of German aircraft in 1918, had increased from seventy miles per hour in 1914, to one hundred and thirty-five miles per hour.

As a sidelight, the rapid production of the Fokker D-7 was very interesting. At the time of the innovation of the Fokker D-7 there were very few factories in Germany which produced any other but machines constructed of wood. In addition, the production schedule of the various factories was not high due to the intricate designs of many of the aircraft then in production. Thus, the appearance of a high performance machine of simple construction and of metal was very nearly revolutionary in principle. However, this type of machine made possible a great increase in produtcion. It was necessary for Fokker to send special tools, and jigs to the various production factories, and his skilled workers had to teach others in the art of metal working, which took time. In three months, the Fokker D-7 was under high production after an entire reorganization of the aircraft industry. Had this reorganization been attempted in time of peace it would have taken well over six months.

A picture of Gen. Herman Goering, Director of German aviation and production of military aircraft and pilots, taken during the World War

Modern German military aviation, which is closely allied with German civil aviation, has progressed rapidly since the beginning of the new Germany. Under the direction of Major-General Goering, formerly wartime commander of the Richthofen Jagdstaffel, Germany has become aware of the possibilities of aviation. His statement: "Germany must become a flying nation, because the future can only belong to a flying nation," has become the creed of the German nation.

On March 1st, 1935, the German Air Force came into official existence. The first three scout squadrons to be formed bear the names of Richthofen, Immelman and Boelcke. Ernst Udet is head of the technical department of the air force. Bruno Loerzer was director of sport aviation and is now active in the air force, Ritter von Greim is commander of scout squadrons and Capt. Christiansen is German Minister of Flying Schools. Germany has not forgotten her heroes of the War.

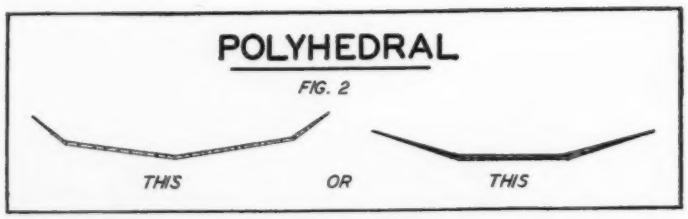
Gen. Goering informed press reporters that the German Air Force was created by new and original methods, because the authorities preferred to "exploit technical and industrial possibilities to the utmost" rather than bring the air force up to strength gradually and run the risk of attack while still in the process of completion. Hence, the production schedule was of great moment to the formation of the German Air Force. The production plan was organized much the same as under wartime conditions, and due to this, the factories have obtained experience in pseudo-wartime production which will stand in good stead in event of war.

At the present time, there are between fifty and sixty thousand workers engaged in the German aircraft factories—more than were engaged in the industry during the War. In 1935, even before the official formation of the air force, there were six hundred combat planes in Germany, but these were not equal to the performance of military machines of other nations. In 1936 the German Air Force boasted of sixteen hundred combat aircraft, the majority of which were equal to the most modern military aircraft in Europe. There

(Continued on page 53)

One of the Dornier-Wal flying boats being produced under a new production program

A 17-passenger Junkers 52-3M transport. This model, modified, has been used for bombing in Spain



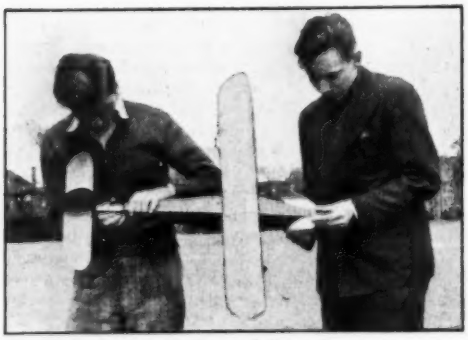
Getting The Most From Your Models

Pertinent Facts Gleaned from the Experience of Experts That Will Enable you to Wring Better Performances from Your Model Planes

By EDWARD LIDGARD and WALLACE SIMMERS

Start of winding: the motor stretched five times its original length. Left to right, Simmers, John Dougherty and George Witt.

Winding under pressure. The motor is 68% wound and is being "wound in."



Assembling motor in the model requires two persons with speed and accuracy.

Launching the R.O.G. The left arm is swung clear after the prop is released.

THIS fascinating hobby of ours requires three types of skill, all of which must be mastered in order to have good models of consistent flying qualities. First, the design of the model must be established; then it needs to be built strong and light, and finally it must be handled in an intelligent, sensible way in order to obtain maximum duration. On the first two points the majority of the model builders rate high, but fall down on the latter. A fine model, well designed and built, may be a potential contest winner, but unless it is handled well it is doomed to a mediocre existence.

Adjusting and handling a model airplane is an art. It cannot be developed over-night; it must be learned from experience by practice, and from the accumulated knowledge of others. No one can expect to fly *only* at the contests and get the best results. Practice in flying sessions is not only a great deal of fun and fine exercise, it is also your school in which you gain the knowledge necessary to get peak performance from your models at a contest, where you need it most.

The old adage "practice makes perfect" certainly holds true in the model game. By frequent flying sessions you get a chance to thoroughly learn the characteristics of each individual model under varied weather conditions. Some people hold the belief that only the worst looking models win at contests. Naturally this does not hold true at all times. However it does contain a thought, because it is quite often true that the battle-scarred model, expertly handled for maximum efficiency is the one that stays in the air the longest.

Confidence is the essence of success. The only way to be calm under contest stress is to be confident of your handling ability, and the ability of your models. This nervous strain on the part of contestants is often the cause of foolish mistakes and blunders which eliminate another potential winner from the field. By flying frequently you learn to plan your flying so as to have everything run off smoothly. In this manner a contest becomes just another flying session, but with an incentive and a goal to provide inspiration. By being able to consider the contest as another flying session you become able to look at various obstacles that may arise in a more sensible manner, and solve them accordingly. Often a model develops erratic flying tendencies with no apparent reason. When this occurs it is disastrous to continue flying unless some remedy is found. The "trial and error" method of solutions if used in this case will invariably fail. A careful check of all the settings very likely will bring the fault to the surface. Check elevator and wing for wrong incidence, warping or loose attachments. Then check rudder alignment and the thrust line.

STRANDS	TORQUE	TURNS
2	1	160
4	2.8	120
6	8	80
8	14	64
10	23	55
12	42	47
14	52	43
16	64	40
18	76	36
20	90	34
22	105	32
24	118	30
26	132	28
28	148	26
30	164	25
32	181	24
34	199	23.5
36	216	23
38	235	22.5
40	256	22
42	276	21.5
44	298	21
46	316	20.5
48	332	20

Here we would like to point out an error which many believe of slight importance; that is, the firm attachment of all surfaces. A loosely attached surface will invariably tend to flutter or slide out of adjustment. There is nothing which will cause a crash easier than a wing which is not attached firmly to the fuselage. A sudden gust will cause one side of the wing to snap up and slide out of place, or make the model lose all equilibrium for a moment and spin in.

Adequate preparation beforehand is mighty important. Many

The model is released and is taking off. Arms are kept clear.

Right: Correct launching for stick or hand-launched model.

"S" hooks should be large enough to put thumbs in their loop. Correct way to hold outdoor model for winding.

a modeler may claim: "Well, my model is all adjusted and packed; I've nothing to worry about." But ask the same modeler the day after the contest how things came off and you are liable to hear the following incidents: The rubber broke tearing out part of the fuselage, and no wood or tissue to use for repairs was available; rubber went dead and valuable time was spent making new motors on the field, (remember, it takes half the time to make the motors at home that it does on the field. You are also less apt to get the motor covered with dirt and grit if it is prepared carefully in advance). Careless calculations necessitated building an additional cross section in order to meet the rules of the contest; the propeller broke and, with no spare repairs, had to be made on the field. This resulted in time lost and probably a bad joint. Incidents like the above could be enumerated for hours, most of which come under the heading of careless preparation and lack of foresight.

Before attending a contest or even before a flying session, a check should be made of all equipment. Do you have a complete tool kit with repair materials? Do you have enough spare parts? Have you packed your models to prevent damage? Think over all possible incidentals which may mar your chances for success and then prepare to meet them. You will notice that those modelers who are consistent winners and handle their models well are seldom caught without supplies and parts. For this reason they spend less time "hustling about" in a furor and more time doing actual flying.

Since the innovation of the new weight rule the number of strands of rubber used on models has gone up accordingly. We use up to 32 strands of 1/8 on 150 square inch models and 44 on 200 square inch models. This may seem excessive but the results justify its use. Naturally this brings us over the present day weight rules, but with no ill results.

Models are closely comparable to gliders because their flight speeds are more nearly alike than any other type of man-carrying airplane. It will be noted through a study of sailplanes that they have quite a high wing loading. This substantiates our hypothesis that a heavy model performs better than a light one. The increased way loading makes the flight smoother and less affected by slight gusts. A high powered model may be flown in a wind up to 25 m. p. h. It gets up into the air to a sufficient altitude before it has a chance to be buffeted and thrown into the ground. A numerical summary will best point out the advantages of high power. (1) Higher climb which makes longer descents possible with greater chance of hooking a riser. (2) Greater stability due to higher wing loading. (3) Hefty construction makes handling easier. (4) Better streamlining can be used without the weight handicap. The use of high power naturally increases the flying speed and necessitates more care in making the adjustments which are finer than encountered in a light model.

The accompanying chart illustrates the comparative energy in motors of graduated sizes. Fig. 1. It may be noted that the energy increases at a far greater rate than the decrease in turns per inch. In other words, the output of power of a 32 strand motor is 2.8 times or 180% that of a 16 strand motor; while the number of turns per inch is reduced but 1/3 or 33%. To those who still adhere to the theory of many winds and a long steady climb, we retaliate with our claim that a high powered model will climb higher and make good time more consistently.

Since each model requires a definite amount of energy to climb to a certain altitude, it is only elementary physics that if a greater amount of energy is applied the altitude will be proportionally greater. This is the basis of our high power-loading practice. Naturally there is a minor loss in available turns, but the additional altitude more than compensates for this.

Straight dihedral has long been the stand-by of the majority of modelers, with those who favor polyhedral (Fig. 2) fighting an unheeded crusade. Today with higher power being used it is even more imperative that polyhedral or tip dihedral be used. The wing is the instrument by which torque is conquered; therefore we should give more thought to it. Approximately 1 1/2 inches per foot of span will prove adequate. Naturally a deep bellied fuselage will require more, and a wing mounted high will require less. Polyhedral or tip dihedral will yield a tight spiral climb which will give more attitude for a given motor run. According to the latest test run in England a wing of curved dihedral in the form of an arc gives higher lift than one of straight dihedral. Therefore as a polyhedral wing more closely approximates an arc, it is naturally more efficient. The eminent aeronautical engineer, Mr. Roul Hoffman, also advocates the use of polyhedral for stability and efficiency.

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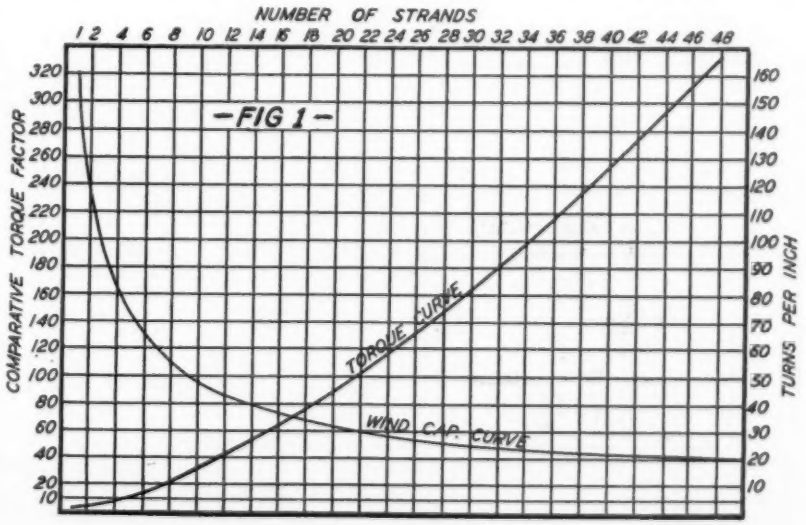
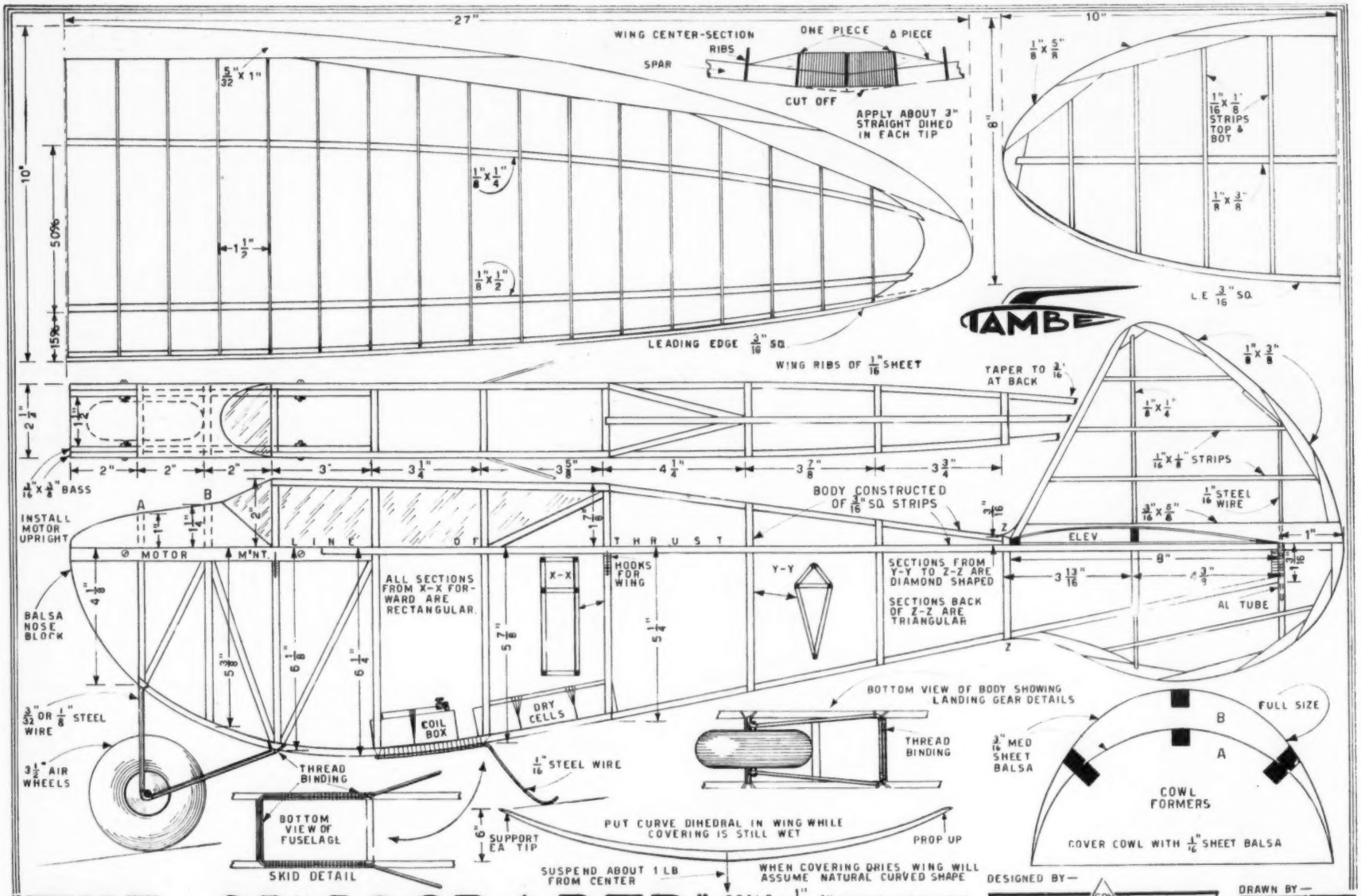




"THE SKYSCRAPER" PLATE 1

SCALE - 1/4" = 1" EXCEPT WHERE NOTED

DESIGNED BY — LEON SHULMAN

DRAWN BY — FELIX ALBERT

How to Build A Universal One Wheeler

Unusual in design but a plane that climbs fast and has great soaring qualities. A wing section of the latest design is used

A Gas Model That Will be a Consistent Winner in Any Contest. It Recently Won a Contest at Miller Field, Staten Island, N.Y., by Making a Flight of Seven Minutes With a Thirty Second Engine Run. It Has a Very Flat Glide

By LEON SHULMAN

SOMETHING new in gas model aviation—a one-wheeler gas model that will accommodate most any motor on the market. To date the ship has been flown with a Trojan, Husky, Cyclone, Gwinn-Aero and Brown "B," "C," and "D"; giving most gratifying results with all of them. The ship can be flown in both the large and small N.A.A. events at contests. On occasions it has flown over five minutes without covering more than 200 feet distance from the take-off spot. Its outstanding flight characteristic is the extreme stability. Due to a low center of gravity and a low center of lateral area, the climb is a tight, vertical spiral. The glide is very flat and slow due to the high lift, stable airfoil. A great deal of airfoils were tested on this ship till the present airfoil was chosen. The ship rides thermals with remarkable facility as has been proven at various times. An associate model builder who constructed the same job, and used a Husky for power, attained flights of over eight minutes. The ship weighed 1½ pounds at the time. If a small motor is used, it is recommended that the builder use lighter wood which will cut down on the wing loading.

The author with the completed plane. Note the compact but efficient design

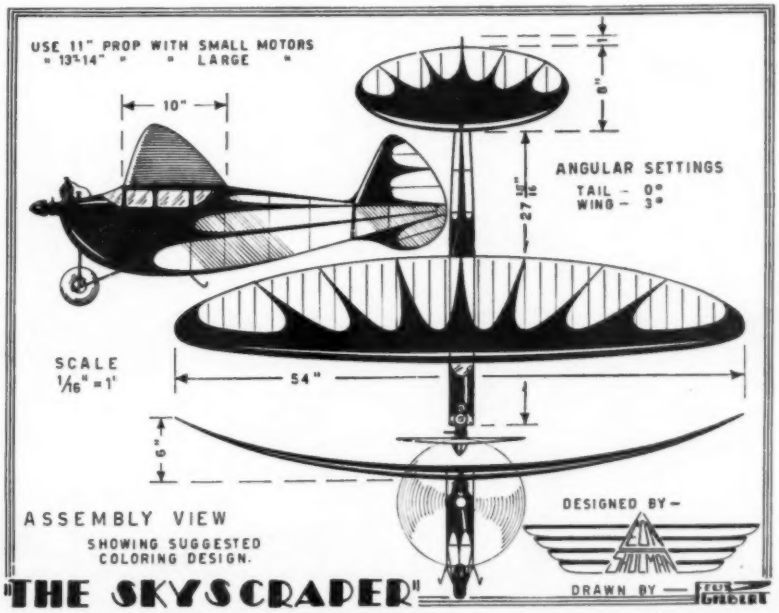
Construction

Fuselage

The fuselage is built of 3/16" square balsa strips. From the nose back to section X-X the fuselage has an oblong cross-section, and that part of the body is built in the orthodox manner. While building it allow the side longerons to extend the full length of the fuselage. Note that the outside motor mounts are integral with the side longerons. Make all the joints running into the motor mount especially accurate and stong, as this part of the body must absorb a great deal of strain. The two sides are completely joined from X-X forward before the rear of the body is built up. Then the two side longerons are joined at the back.

The front of a new top and bottom longeron is now glued in place, and then joined to the respective rear positions as indicated on the plans. The rest of the braces are now set in place; so that when finished, the sections from Y-Y to Z-Z will be diamoned shaped, and from Z-Z to the back they will be triangular. The nose block of soft balsa is glued to the body and then carved to conform to the outline of the nose. It should be rounded as much as possible. The cowl formers are shown in full size on the bottom right of plate one. Landing gear and skid details are shown clearly on plate one with everything labeled. Note that the skid is one complete piece.

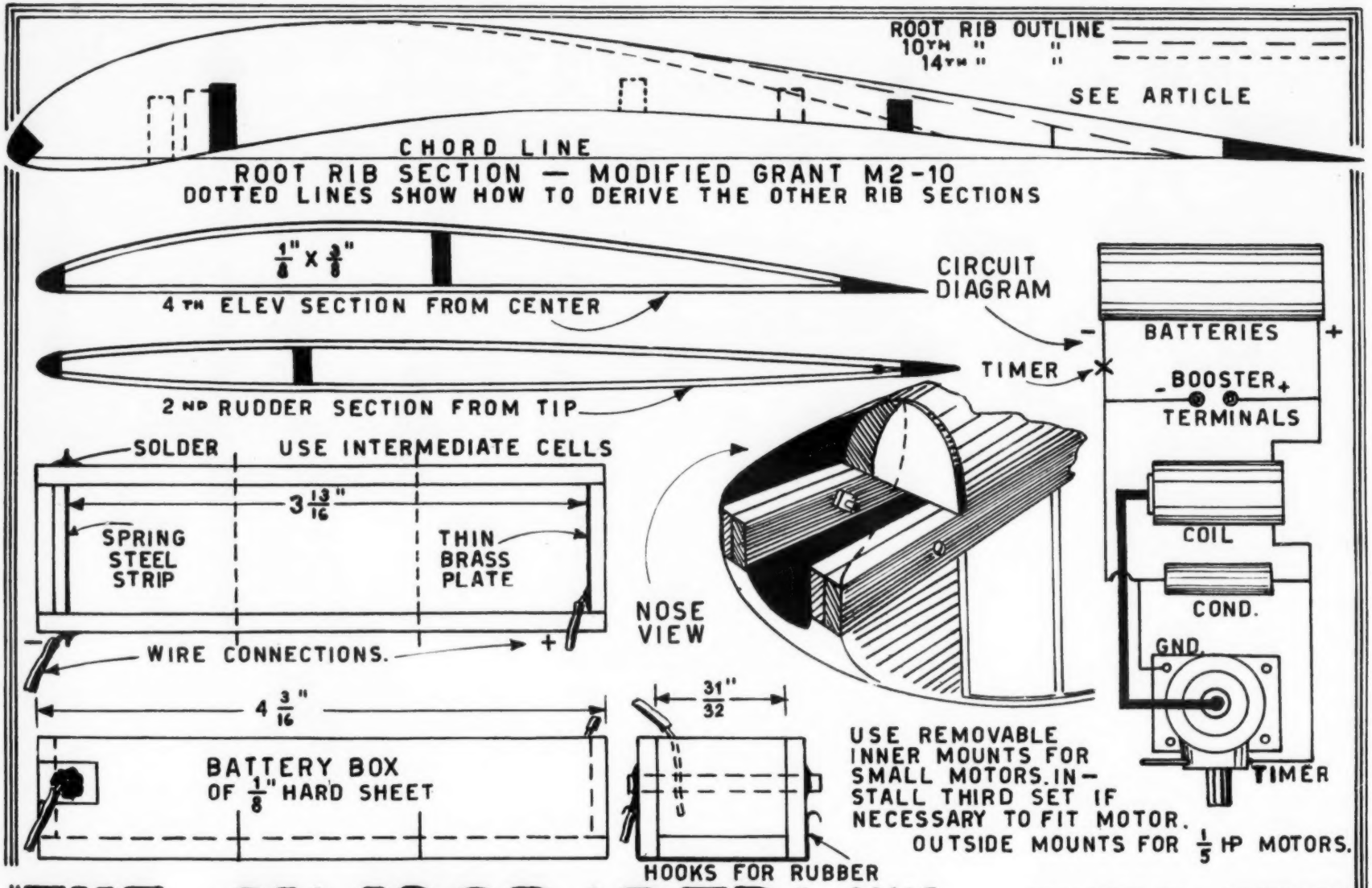
The landing gear is one piece. The axle is a straight piece of wire, bound with iron wire and soldered to the wire struts. Battery box details are shown on plate two. The coil box is built around the coil. Note the hooks near the side longerons to hold the wing rubber bands. The circuit diagram is shown on plate two. The upper timer is the self-timer, while the lower one is the one on the motor.



Tail

All tail construction is covered completely on the plans. The rib sections are shown on plate two and should be used as a guide in con-

(Continued on page 52)



"THE SKYSCRAPER"

SCALE FULL SIZE

PLATE 2

DESIGNED BY- LEON SHULMAN

DRAWN BY- FELIX GILBERT

The Physics of the Airplane

A Simple Explanation of the Laws That Govern Airplane Design—Rotary Motions and Their Relation to Aircraft

By LT. JAMES EAMES and WILLIS L. NYE

ARTICLE No. 4

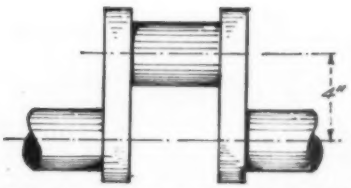


FIG. 3

THE ANGULAR VELOCITY OF THIS BEARING AT 1800 R.P.M. = ANGULAR DISPLACEMENT IN TIME "T." =
1800 ÷ 60 = 30 R.P.M.
ANGULAR VELOCITY = 60 × 3.1416 RADIANS PER SECOND
A PISTON ATTACHED TO THIS ROD BEARING MOVES =
VELOCITY × ANGULAR VELOCITY =
$V = \frac{1}{3} \times 60 \times 3.1416 =$
$V = 20 \times 3.1416 = 62.8320$ F.P.S.
NOTE: 2 RADIANS × 3.1416 = 360 DEGREES

THE science of aeronautics must continually deal with problems of mechanics wherein rotary and circular motions are encountered in the functioning of certain equipment which is part of the airplane. These motions may be constant or aperiodic. Uniform or constant motions are those which involve the propeller, aircraft instruments such as the turn indicator, the directional gyro, and the aircraft motor whose parts revolve under the impulse of each explosion in the cylinder. Aperiodic motions are those which have an irregular occurrence. Examples of these kinds of motions are found in chronometric tachometers. Certain types of compasses employed in airplane navigation have aperiodic motion.

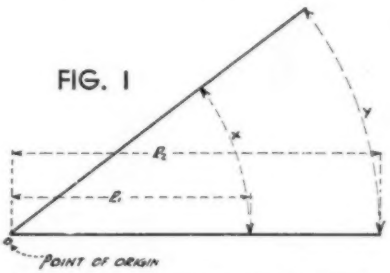
The requirements of modern science have been satisfied by the measurement of angles in a new unit of angular measure. The use of the degree is not quite satisfactory, particularly when applied in solving many of the problems of stresses in certain beam members in airplane structures or in measuring angular velocities of rotating parts of the motor or the propeller. The newer unit is known as the radian. A radian may be defined as the angle whose arc is equal to its radius. The radius of a circle can be applied to the circumference 2×3.1416. In analyzing this, it is seen that 2×3.1416 is equal to 360 degrees. Therefore one radian is equal to 57.3 degrees. See Fig. 1.

This relationship establishes a definite equation which can be used to solve certain problems. This equation establishes that the angle in radians is equal to the arc divided by the radius. In mathematical form: $x = \frac{s}{R}$

For example, solve the following problem. If the control stick of an airplane is moved through an angle equal to 25 degrees, what is the number of radians:

Solving: Radians $= \frac{25}{57.3}$ or .43 radians

FIG. 1



SHOWING HOW ANGULAR VELOCITY INCREASES WHEN THE RADIUS FROM THE POINT OF ORIGIN IS INCREASED
$R_1 : X :: R_2 : Y$

In the design of mechanical devices such as supercharger blowers or impellers, crank-shafts or propellers, the measurement of angular velocity is very necessary. For instance, the tip speed of a propeller must be known in order to determine the propeller efficiency. The tip speed directly governs the diameter that must be used to attain some specific propulsive efficiency. These calculations all involve the measurement of angular velocity. Another instance where angular velocity is measured is in crank-shaft design or in the supercharger impellers. The tip speed of a propeller for good performance should not exceed 1000 feet per second or, roughly, should not approach the velocity of sound.

Angular velocity is defined as the rate which a certain point on a rotating mass passes a specific point during rotation. This angular velocity is measured in radians. The number of radians which are encompassed during rotation of the point on the mass per unit of time is the angular velocity. A theorem which applies to this subject is as follows: When the rate of rotation of the point on a rotating object is constant, the angular velocity attained by the point is constant and is equal to the angle through which the point revolves in some specific interval of time. It is also possible to measure angular velocity in revolutions per unit of time. In this instance, the angular velocity equivalent in radians is obtained by multiplying the number of revolutions per a specific interval of time by 2×3.1416. For example: If a propeller makes 1500 r.p.m. what is its angular velocity? Solving: Angular velocity $2 \times 3.1416 \times 1500$ equals the angular velocity. $3.1416 \times 2 \times 1500$ equals 9324.8 radians per minute.

In making a study of angular velocity, it is apparent that the angular velocity will increase as the radius of the path of the circular motion increases. Linear speed increases as the distance from the center of rotation enlarges. The same equation as shown here can be applied in any other instance where it is necessary to determine the angular velocity of some rotating component of the airplane.

All rotating bodies do not move at a uniform or constant angular velocity, but they may be subject to angular acceleration. The increase or decrease in acceleration is the same as linear acceleration increases or decreases. Without making further exposition as to the relation of the two units of time in the equation, the following equation will give the angular acceleration.

For example: The angular velocity of an idling propeller is 300 radians per second. During an acceleration extending over ten seconds time, the angular velocity reaches 500 radians per second. What is the angular acceleration?

$$\text{Angular acceleration} = \frac{\text{change in angular velocity}}{\text{time}}$$

$$\text{Angular acceleration} = \frac{\text{500 radians per sec.} - \text{300 radians per sec.}}{\text{10 seconds}}$$

$$\frac{500 - 300}{10} = \frac{200}{10} \text{ or 20 radians per second}$$

In the study of aircraft, we encounter the term "torque." Torque may be defined as the product of a force and the linear distance between the line of action of the

(Continued on page 40)

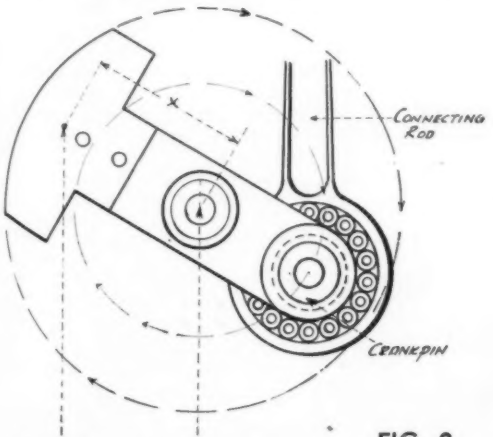
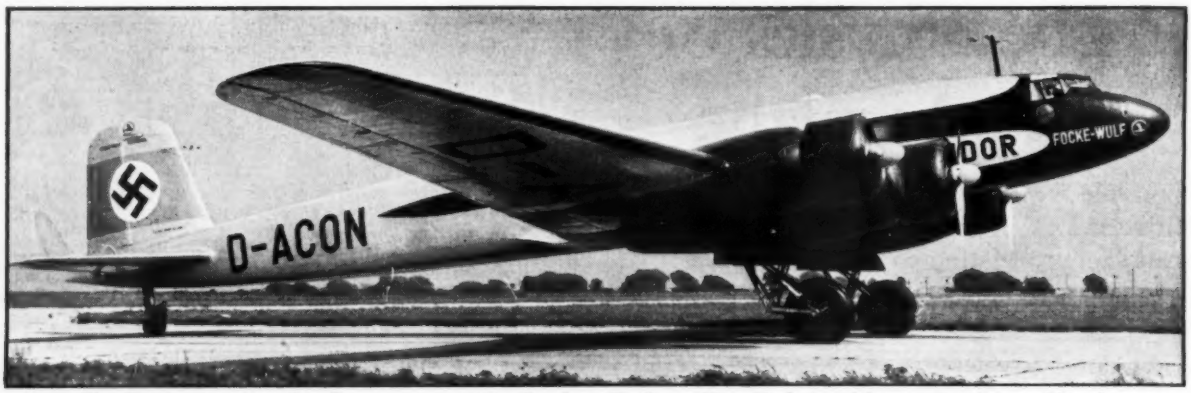


FIG. 2

THE GREATER DIMENSION "X" IS, THE GREATER THE DEGREE OF ROTARY INERTIA. IN RADIAL ENGINES, DIMENSION "X" IS MADE AS LARGE AS POSSIBLE WITHIN THE LIMITS OF THE ENGINE.



The German transport that flew non-stop 3,900 miles from Berlin to New York in 24 hours, 57 minutes. (Acme)

By

ROBERT C. MORRISON

Frontiers of Aviation

The navy-built N3N-1. (Strasser)

The Navy Curtiss SBC-3. (Larkins)

IN THE sky there was a wide, mile-long red streak. It sparkled in the sunshine and made those on the ground gasp in surprise for it looked like a new sort of comet streaking through the air; but lo, it was just Douglas' new DC-4 going through its dump valve tests for Bureau of Air Commerce officials. A good portion of the airliner's 2,000 gallons of that red liquid was dumped within the space of a few seconds. As it passed by the tail surfaces in one large billowy streak it certainly was a spectacle.

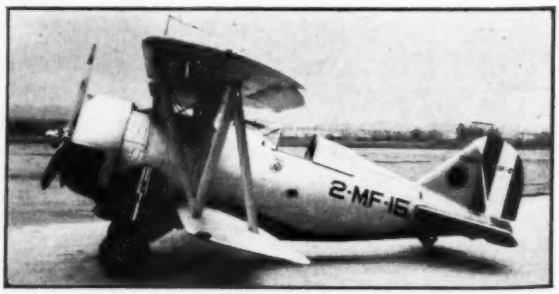
Tests on the DC-4 are now drawing to a close . . . and with a very successful ending. They mark an important step into the future and have taught our engineers many things so they may forge ahead with greater creations. The completion of these large airliners like the DC-4 has proven aviation's permanency. Though the aviation industry has already progressed with leaps and bounds, progress is destined to be even greater in the years to come. Why? It no longer depends on high pressure promotion schemes. It now has wealth to back it up, thousands of experienced workers, a volume of business and what is more important, it has the interest of other industries who have now become dependent on the aviation industry where once it was just the reverse. Already the architect and the builder have shown their interest in aviation's future.

At North Beach, Queens, New York, Mayor LaGuardia's great $15,000,000 airport project is underway. Architects have designed a huge modernistic terminal which is destined to become as famous as the Grand Central Station in New York; for not only will all planes from the West land there, but the giant ocean airliners from Europe will arrive and depart at this new airport. The peoples of the world will see it, speak of it and arrive and depart as casually as one does at any railroad station today. It will bring the world closer together.

In the center of New York the airlines are building their own $2,0000,000 structure where their executive and ticket offices will be located and where passengers may board a limousine and be at the airport in a few minutes time. The building is one of archi-

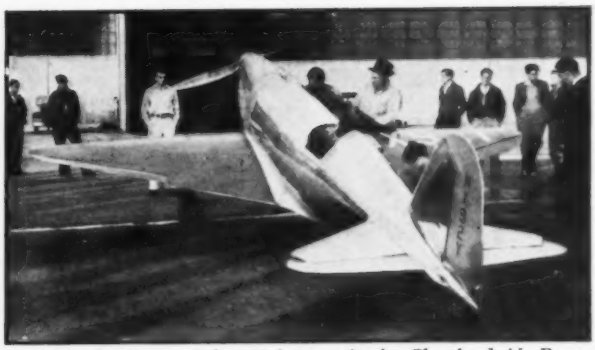
The Alcor C-6-1 with two Menasco engines mounted flat. (Williams)

Latest Lockheed U.S. Army cargo plane that took part in the recent army competition for orders. (Morrison)



The Grumman F3F-2, the U.S. Marines' latest fighter, powered with a 1000 hp. Cyclone engine. (Williams from Swisher)

Czechoslovakian Air Force pilots in full kit with their planes on the military aerodrome near Prague, "ready for business." (Acme)



The Crosby Racer ready to take part in the Cleveland Air Races. Note the fin-like wings. (Hartley)

Highlights of Developments in the Field of Airplane Design and Production that Will Help to Keep You Abreast of the Times—How to Build the Spencer-Larson Amphibian

tectural splendor, an edifice exemplifying permanency.

At Chicago, United Air Lines has just completed a large main operations building with brick-glass enclosed lobby, spacious kitchens for cooking meals that are served on the airliners and a well equipped medical laboratory.

The "Architectural Forum" magazine in its last issue dealt extensively with descriptions of Glenn L. Martin's new assembly plant, which incidentally is the largest single flat-span structure in the world, and also Pratt & Whitney's engine test structure. The magazine compares Martin's new building with the huge new structures now being constructed by the automobile industry and it illustrates that the airplane companies' new buildings are well in keeping with the progress being made by the automobile manufacturers.

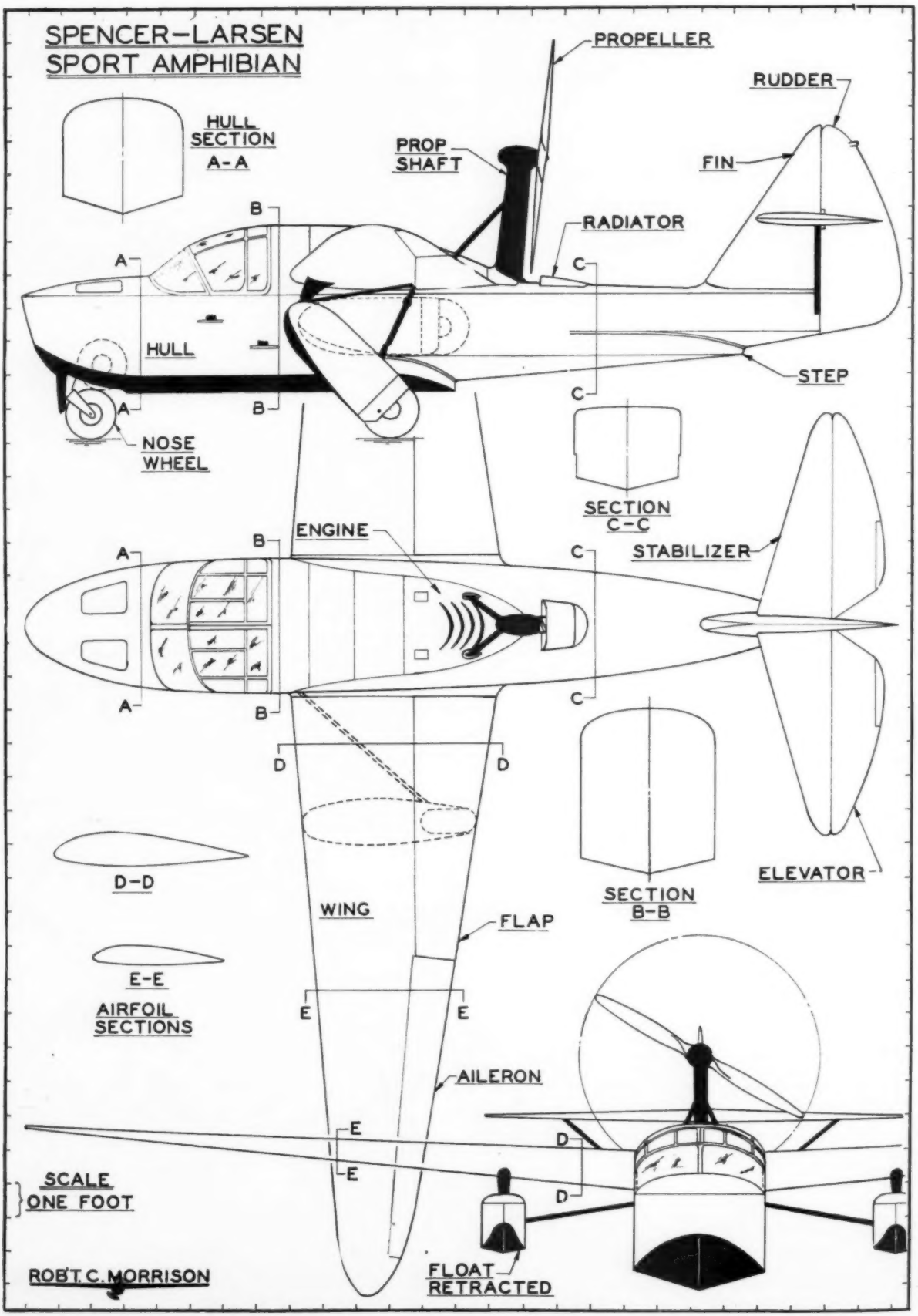
But why this enormous building program by the aviation industry? The reason is that every important manufacturer of airplanes is designing planes with wingspreads in the neighborhood of 250 feet, bombers for the army, patrol boats for the navy, huge commercial landplanes for transcontinental service and collosal flyingboats for trans-oceanic trade. It is reported that Consolidated Aircraft will discharge 700 of its employees, leaving a remainder of 700 in the company while extensive alterations are made in the shop to prepare for the building of larger ships for the navy. What is more significant, this revamping is to make way for the addition of stainless steel equipment for building the all-steel airplanes of the near future. The remodeling of the plant will take place as soon as the last order of navy PBY boats are delivered, and in the following six months the plant should be re-equipped and ready to begin production on the forthcoming four-engined patrol bombers and future military and commercial business.

The airplanes are now becoming so large that drastic changes must be made in the design of airports and factories, but then the problem is not completely solved by just building larger runways and structures. In spite of long runways it will be difficult for

(Continued on page 49)

Here is a British robot plane, controlled entirely by radio from the ground, going through its paces. (Intern'l)

In the picture below spectators watch the greatest air display in the history of Soviet Russia; on Aviation Day at Moscow, now an established tradition in Soviet life. The display marked the 15th anniversary of the establishment of a civil air force in the Soviet Union. Col. Charles A. Lindbergh was one of the prominent spectators. The best air men of the Soviet Union demonstrated their daring and skill at this great meet. It took place at the flying field of the Central Club of Tushino, just outside of Moscow. The show consisted of a mimic battle of pursuit planes, a mass parachute jump, a merry-go-round (a performance put on by five speed planes) and many other feats. The spectators were profoundly impressed by an "air express" of nine gliders towed by a twin-motored plane. (Sovfoto)


SPENCER–LARSEN
SPORT AMPHIBIAN
PROPELLER
RUDDER
HULL
SECTION
A-A
PROP
SHAFT
FIN
RADIATOR
HULL
STEP
NOSE
WHEEL
SECTION
C-C
ENGINE
STABILIZER
D-D
WING
FLAP
SECTION
B-B
ELEVATOR
E-E
AIRFOIL
SECTIONS
AILERON
SCALE
ONE FOOT
ROBT. C. MORRISON
FLOAT
RETRACTED

Designing Your Gas Model "Prop"

How to Determine the Final Characteristics of Propellers to Be Used on Planes, Under Various Conditions of Wing Camber and Angles of Incidence

Article No. 79 By CHARLES HAMPSON GRANT Chapter No. 5

THOSE who have read the preceding article will understand the meaning of "camber factor" and how to use it. Briefly, it is a numerical value derived from the heighths of the upper and lower camber of a wing section relative to the chord length. In effect it is the measure of the lifting capacity of the wing per unit of area. It is suggested that you read the preceding article of this series (No. 78), if you have not already done so, in order that you may obtain an understanding of the significance of this factor.

If the wing loading of your model and the camber factor of the wing is known, the velocity of the plane and the correct pitch of the propeller may be quickly determined by means of the graph that appears at the bottom of this page.

The camber factor may be calculated by means of the following formula:

$$F_R = \left(\frac{3H_u + H_B}{4C}\right).$$

In the formula, F_R = the camber factor; H_u = the maximum heighth of the camber of the upper surface of the wing above the chord line; H_B = the heighth of the camber of the lower surface above the chord line; C = the length of the wing chord at the section of the wing being considered.

Though the camber factor of any wing section may be calculated by the designer, a table of camber factors of several popular wing sections is given here for the convenience of model designers.

Wing Section	Camber Factor
Grant X	0.885
Grant X8	0.777
Grant X9	0.692
Grant X10	0.623
Grant M2	1.140
Grant M2-8	1.048
Grant M2-9	0.932
Grant M2-10	0.838
Clark Y	0.630
Eiffel 400	0.762
Clark Y Upper R.A.F.-32 Lower	0.740
N.A.C.A. M12	0.538

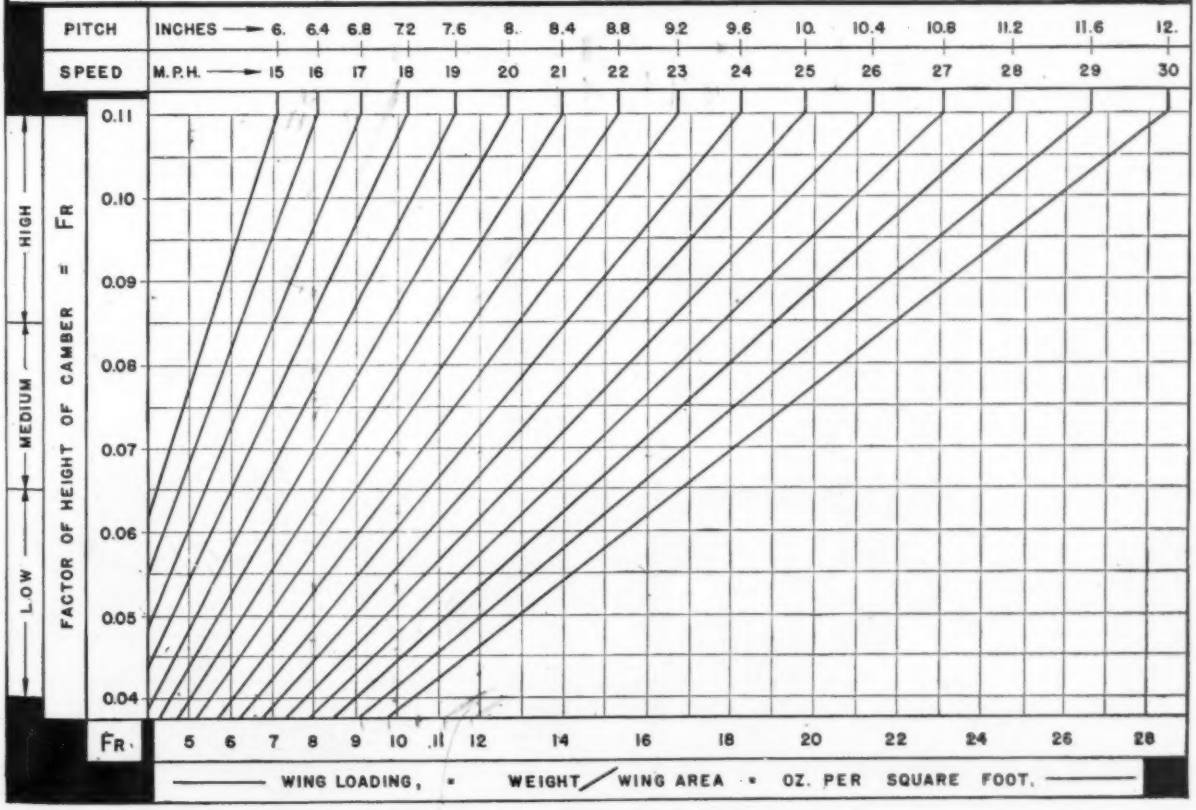
As the value of any camber factor shown in the table is a measure of the lifting effect of the wing at normal flying angles of attack, the designer may choose readily the wing that will give the lift value he may desire. The speed of his model and the required propeller pitch may be determined from the graph shown below. The graph is plotted in terms of the camber factor and the wing loading. The wing loading is easily found by dividing the total effective wing area by the total weight of the plane ready to fly.

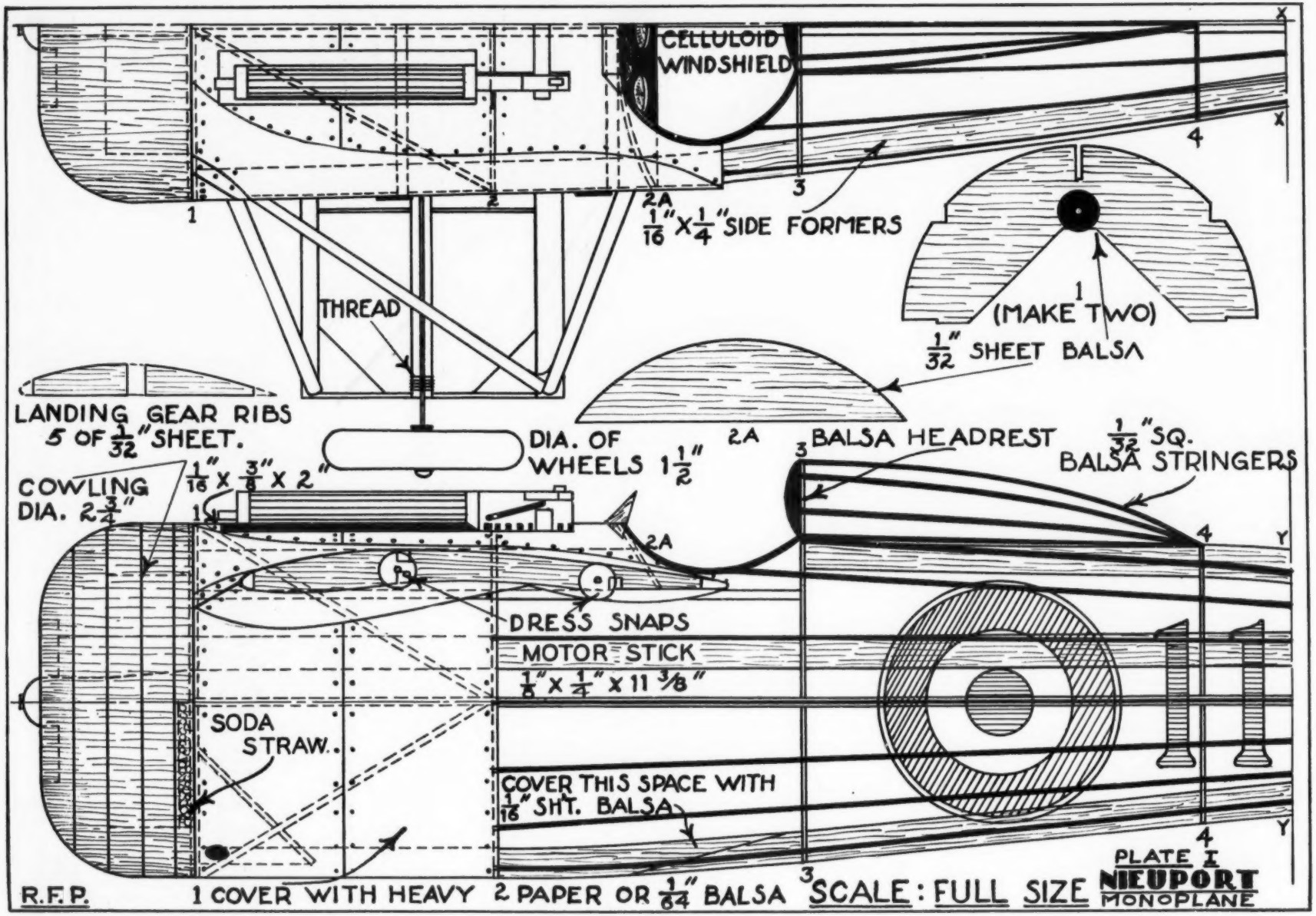
Speed of Plane at Various Angles of Incidence

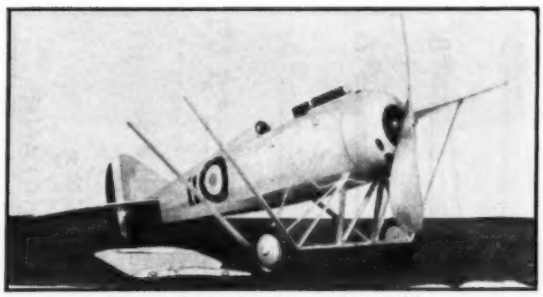
The speeds recorded at the top of the graph are those developed at three degrees

(Continued on page 44)

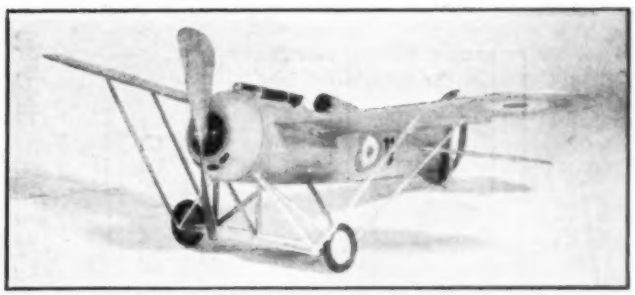
CHART SHOWING PITCHES AND SPEEDS FOR VARIOUS WING LOADS AND CAMBERS AT THREE DEGREES ANGLE OF INCIDENCE.




CELLULOID WINDSHIELD
X
X
4
3
2A
1/16" X 1/4" SIDE FORMERS
1
2
THREAD
1
(MAKE TWO)
1/32" SHEET BALSA
LANDING GEAR RIBS
5 OF 1/32" SHEET.
DIA. OF WHEELS 1 1/2"
2A
3
BALSA HEADREST
1/32" SQ. BALSA STRINGERS
COWLING DIA. 2 3/4"
1/16" X 3/8" X 2"
1
2A
4
Y
DRESS SNAPS
MOTOR STICK
1/8" X 1/4" X 11 3/8"
SODA STRAW.
COVER THIS SPACE WITH 1/16" SHT. BALSA
Y
4
3
R.F.P.
1 COVER WITH HEAVY 2 PAPER OR 1/64" BALSA 3
SCALE: FULL SIZE
PLATE I
NIEUPORT
MONOPLANE



The model in the course of assembly



The finished plane with a unique strut arrangement

Build and Fly the 1919 Nieuport

A Model That Flies Well and Which When Completed Will Be One of the Most Interesting Ones in Your Collection Because of Its Unusual Structural Features and World War Design

By ROGER F. PARKHILL

"WHAT, another World War model?" Such may be the surprised cries of those model enthusiasts who think that we have exhausted the possibilities of World War airplanes for model representation. Although comparatively unknown, the 1919 Nieuport monoplane was a highly efficient pursuit type; a modified version of which won the final Gordon Bennett speed trophy for France. This particular Nieuport was designed late in 1918 to meet the challenge offered by the Fokker D-8, the Junkers monoplane, and other fast German airplanes of that period. Only a few airplanes were completed; the Armistice stopping further production.

In its construction, this ship is reminiscent of the early 1914 Nieuport monoplanes; while, at the same time, it retains the fuselage outlines of the 1917 Nieuport Model 28. The wing construction is interesting, having been designed with a distinctive trailing edge and wing-root windows to facilitate visibility. This monoplane was the first of the Nieuport series to be constructed entirely of steel tubing instead of wood.

The proportions of the original design remain unchanged in this model; the size of the dihedral and tail surfaces being ample for stable and consistent flight. To withstand severe shocks and to facilitate handling, the wings and cowling are fastened with dress snaps.

Fuselage

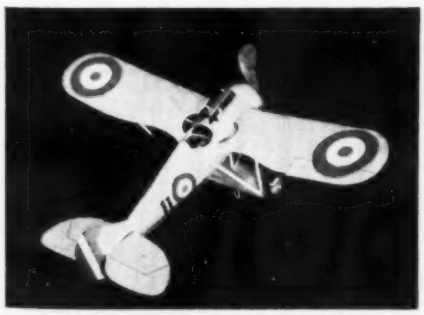
Trace the two 1/16" x 1/4" side and the two 1/16" x 1/4" top and bottom fuselage formers from 1/16" sheet balsa. Trace and cut out the bulkhead halves to shape from 1/32" sheet balsa. Glue the halves together along their center lines. Mark with pencil the position of the 1/32" square balsa stringers on each bulkhead and cut the notches for the 1/16" x 1/4" master formers. Mark the correct spacing for the bulkheads on the two side formers and cement the bulkheads in place on these formers only. After the cement has set for a few minutes glue the top and bottom master formers in place. Be sure the resulting frame is absolutely true and set aside to dry.

After the cement is dry, glue the 1/32" square balsa stringers and the bamboo cockpit outline in place, holding securely with small pins until the cement is dry. Cement the halves of two dress snaps to each center section rib and assemble the center section in place on the plane, being careful to keep the ribs vertical. Cement the 1/16" triangular landing gear braces in place on the first bulkhead and add the other braces and struts shown on plates one and two. Cover the space between the first and second bulkhead and below the center section with bond paper, light drawing paper, or 1/64" sheet balsa. Add the other fillets as shown on the drawings and photographs. Cover the remainder of the fuselage with narrow strips of Japanese tissue, using banana oil for adhesive and striving to eliminate wrinkles as much as possible. After completely covering, spray the entire surface with water in an atomizer; and, after completely drying, brush on one thin coat of clear dope.

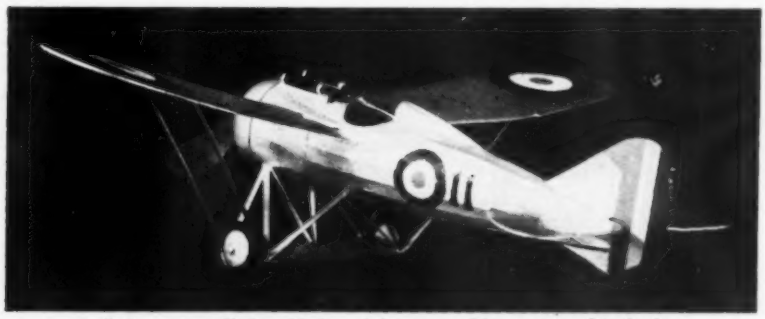
Add the windshield, gun mount, tailskid and other exterior details. Construct the landing gear auxiliary wing and cover this wing with either tissue or 1/64" sheet balsa.

(Continued on page 42)

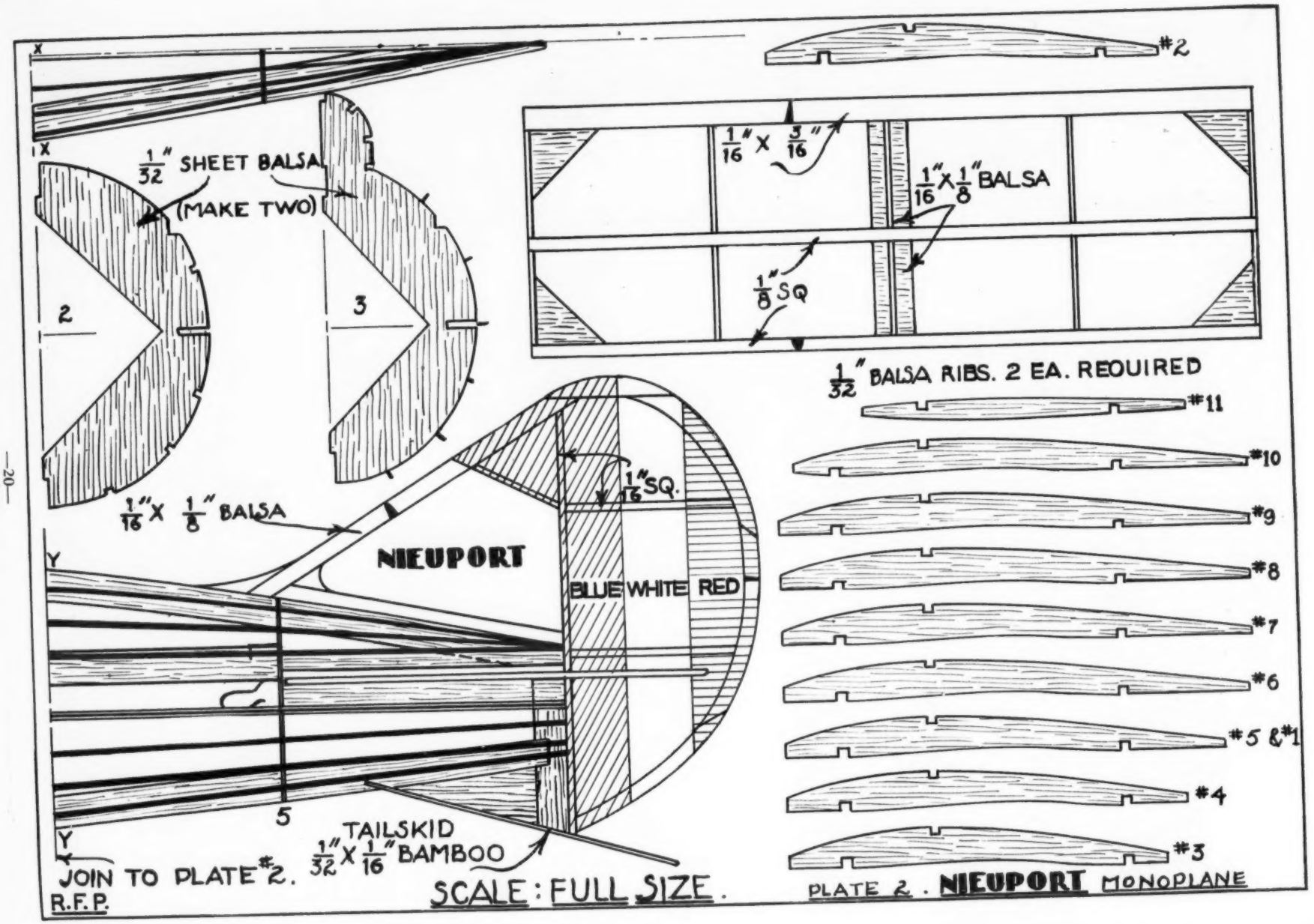
A close-up of the nose showing the details of the cowl machine guns and cockpit

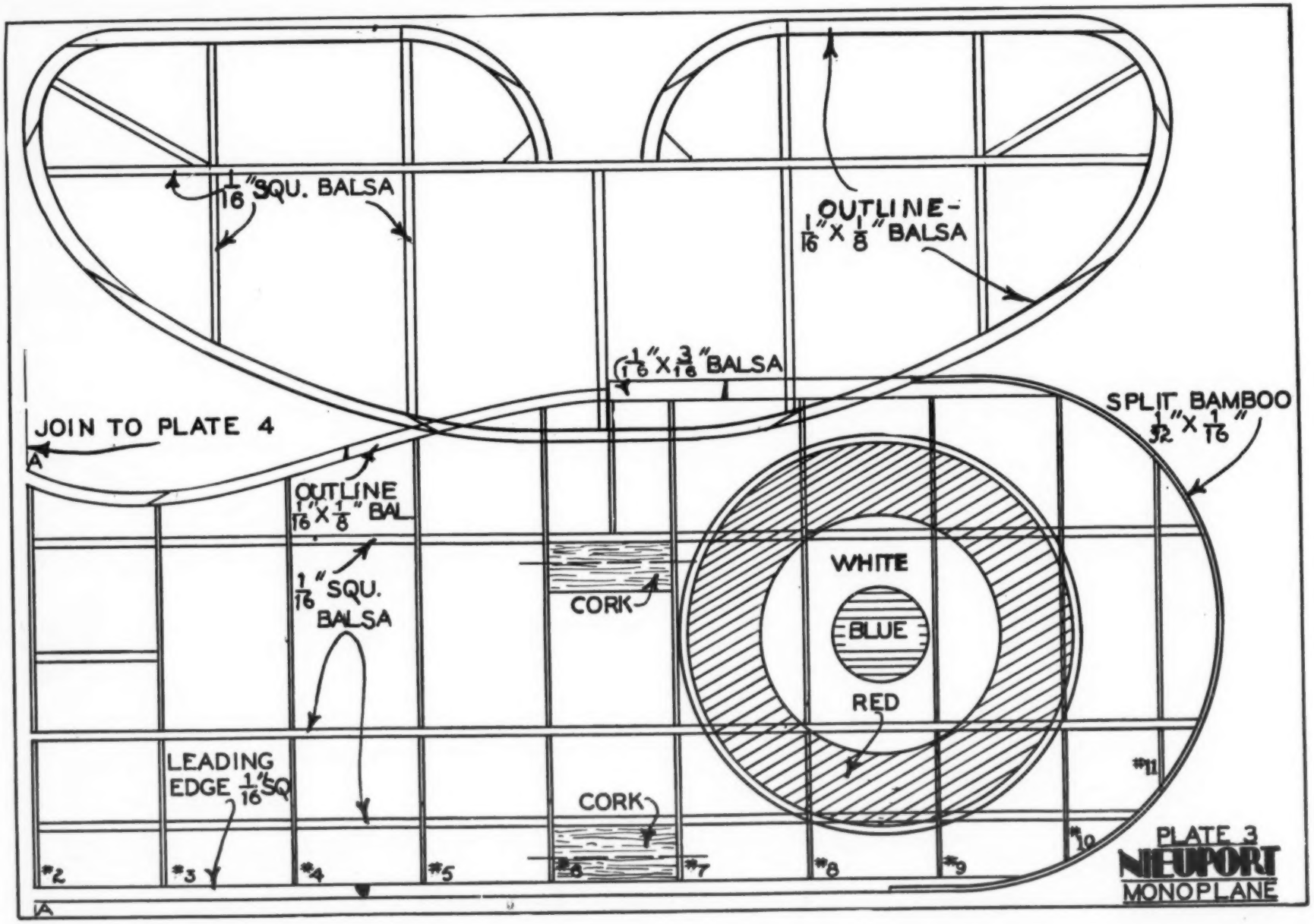


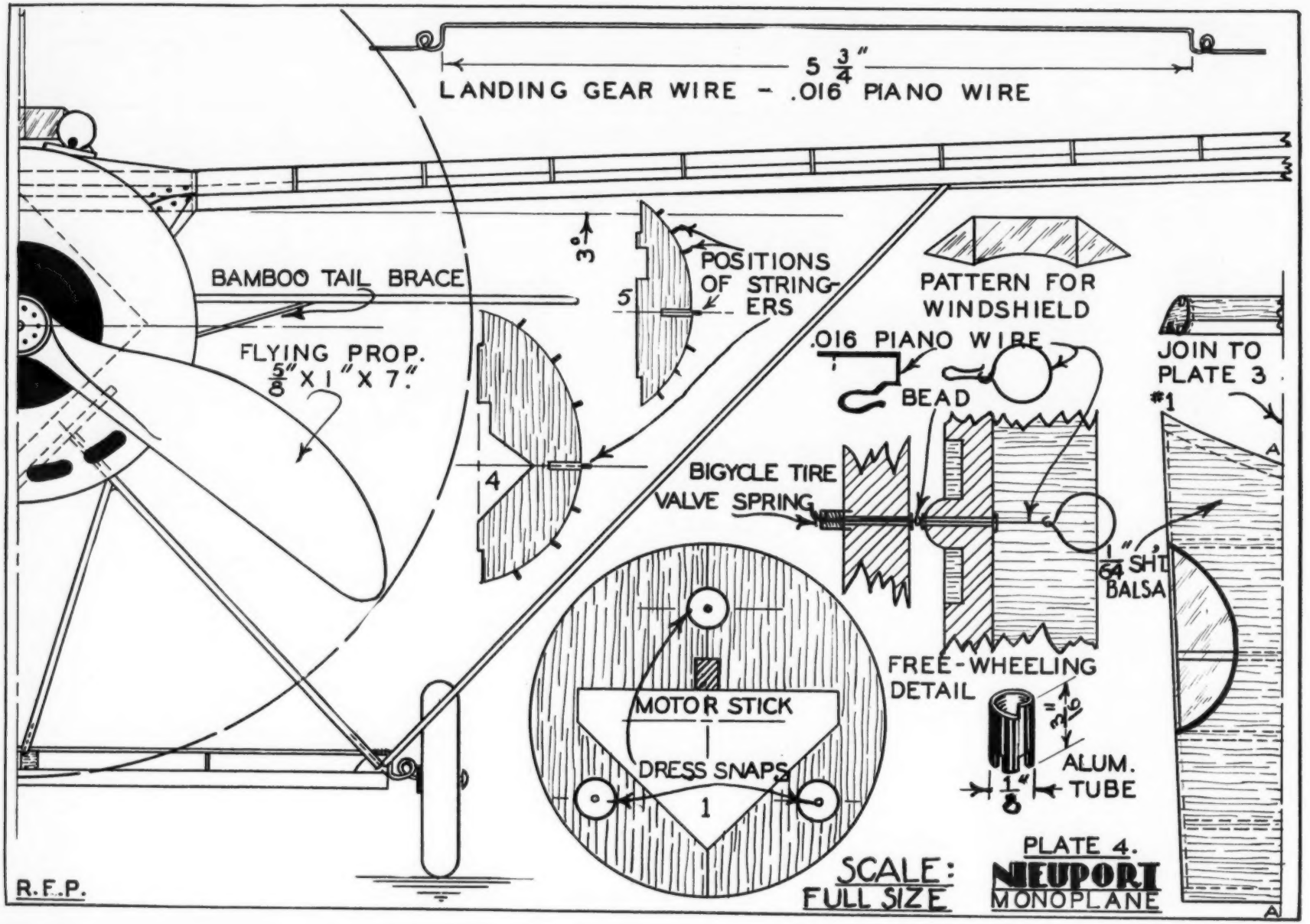
Ample tail area makes it stable

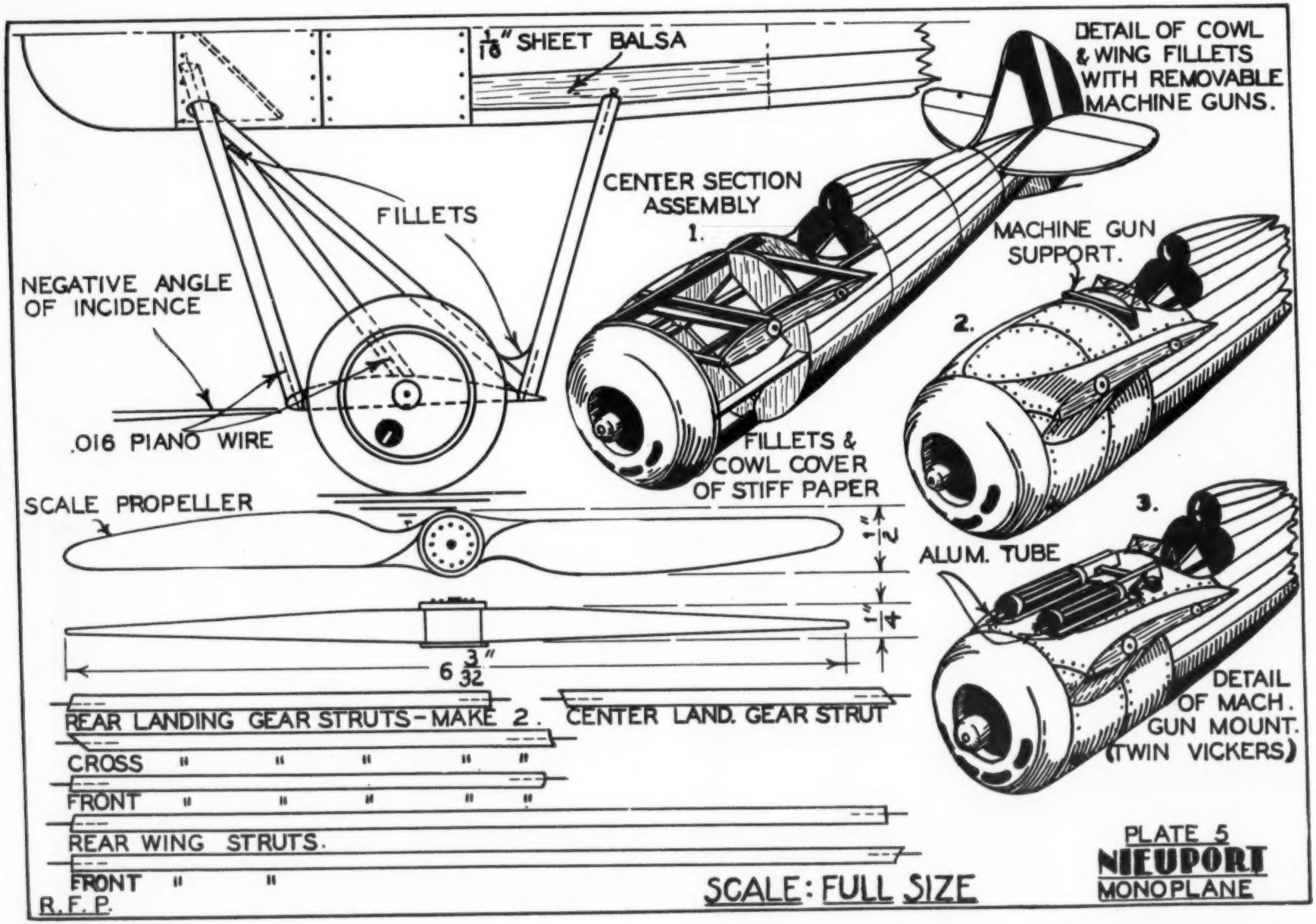


It is most realistic with its miniature machine guns and insignia


X
X
1/32" SHEET BALSA
(MAKE TWO)
2
3
1/16" X 1/8" BALSA
NIEUPORT
BLUE WHITE RED
1/16" SQ.
Y
Y
5
TAILSKID
1/32" X 1/16" BAMBOO
JOIN TO PLATE #2.
R.F.P.
SCALE: FULL SIZE.
#2
1/16" X 3/16"
1/16" X 1/8" BALSA
1/8" SQ
1/32" BALSA RIBS. 2 EA. REQUIRED
#11
#10
#9
#8
#7
#6
#5 & #1
#4
#3
PLATE 2. NIEUPORT MONOPLANE


1/16" SQU. BALSA
OUTLINE - 1/16" X 1/8" BALSA
1/16" X 3/16" BALSA
JOIN TO PLATE 4
A
SPLIT BAMBOO 1/32" X 1/16"
OUTLINE 1/16" X 1/8" BAL
1/16" SQU. BALSA
CORK
WHITE
BLUE
RED
LEADING EDGE 1/16" SQ
CORK
#2
#3
#4
#5
#6
#7
#8
#9
#10
#11
A
PLATE 3
NIEUPORT
MONOPLANE


5 3/4"
LANDING GEAR WIRE - .016 PIANO WIRE
3°
5
POSITIONS OF STRINGERS
BAMBOO TAIL BRACE
FLYING PROP. 5/8" X 1" X 7"
4
PATTERN FOR WINDSHIELD
.016 PIANO WIRE
BEAD
JOIN TO PLATE 3
#1
A
BIGYCLE TIRE VALVE SPRING
1/64" SHT BALSA
FREE-WHEELING DETAIL
1/2"
ALUM. TUBE
1/8"
MOTOR STICK
DRESS SNAPS
1
R.F.P.
SCALE: FULL SIZE
PLATE 4.
NEUPORT MONOPLANE


1/16" SHEET BALSA
DETAIL OF COWL & WING FILLETS WITH REMOVABLE MACHINE GUNS.
CENTER SECTION ASSEMBLY
1.
FILLETS
NEGATIVE ANGLE OF INCIDENCE
.016 PIANO WIRE
MACHINE GUN SUPPORT.
2.
FILLETS & COWL COVER OF STIFF PAPER
SCALE PROPELLER
1/2"
1/4"
6 3/32"
3.
ALUM. TUBE
DETAIL OF MACH. GUN MOUNT. (TWIN VICKERS)
REAR LANDING GEAR STRUTS - MAKE 2.
CENTER LAND. GEAR STRUT
CROSS " " " " "
FRONT " " " " "
REAR WING STRUTS.
FRONT " "
R.F.P.
SCALE: FULL SIZE
PLATE 5
NIEUPORT
MONOPLANE

"Gas Lines"

Official Section of the National Aeronautic Association Gas Model Division

NATIONAL AERONAUTIC ASSOCIATION HEADQUARTERS NEWS

Pict. No. 1. George Herbert's model Cub. Built from plans in MODEL AIRPLANE NEWS and powered with a Baby Cyclone Model "F".

THERE are a number of very short-sighted young men who, judging from their remarks, see little value in the organization of gas model activities under the NAA. They have been proclaiming their independence of such affiliation with a very loud and shrill voice. We feel that this is due to the fact that they have given little thought to the matter and do not realize that unless some organization regulates gas model flying, rules against these models will be made which will stop their flying all together. Perhaps they do not take this seriously.

Pict. No. 2. Richard Obarski of the Chicago Aeronuts, who won a recent meet.

We have some very pertinent remarks from Mr. J. D. Bunch of 5009 South Hoover Street, Los Angeles, Calif., in this respect. Mr. Bunch is one of the leaders in the aircraft industry and has a clear vision in respect to the policies that may be put into effect to curtail gas models. He says:

"You must realize that it is imperative to get this entire movement (NAA organization) under way immediately to protect gas models from unnecessary onerous and thereby prohibitive regulations by the Bureau of Air Commerce. Such regulations might start coming forth due to recent reorganization of the bureau under the old axiom: 'A new broom sweeps clean.'

"I wish to impress upon you the fact that liberty as a result follows only everlasting vigilance."

We call the attention of all dissenters to this quotation, and request that before they speak too lightly they investigate the truth of the matter for themselves. The remark in respect to everlasting vigilance being the price of liberty is possibly a truism which may be appreciated only by those of mature years and those who have had a chance to gain experience through hard knocks. Of course some young model builders are not fortunate enough to have acquired the wisdom which comes with experience.

A favorite question when NAA membership is encouraged is: "What do we get out of it?" The answer is not what you get out of it, but what do you get out of it if you don't join—and this will be the prohibition of model flying

The NAA because of its dignity and far-reaching influence, is in a better position to create favorable feeling toward gas model operation than any other organization in the country. This one effect alone is sufficient reason to start out and help in the good work of organizing the gas model builders which it has undertaken. We hope that the selfishness of a few individuals will not prevent the enjoyment of gas model builders as a whole. The value of organization and the influence which it may wield might be illustrated by the difference between a well drilled army with unity of purpose and a mob with many objectives. Usually the mob gets no place.

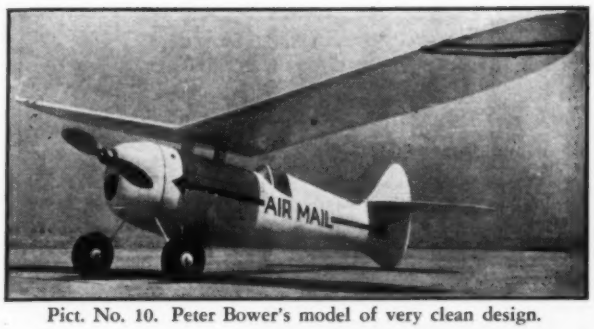
Let's all get together and organize gas model building and flying on the proper basis, so everyone may enjoy it.

Here's some news from our readers. George Herbert of 508 Second Street, Donora, Pa., undertook to build a model of the Taylor Cub from plans in MODEL AIRPLANE NEWS. He tells us that it was

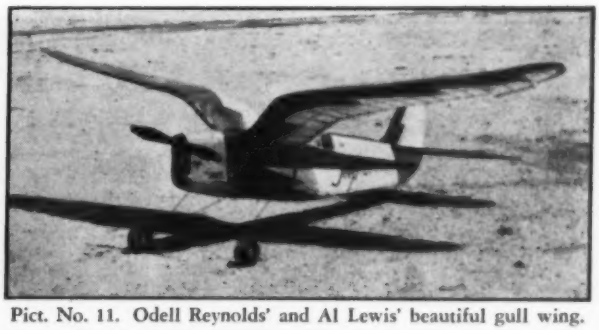
Pict. No. 3. A Comet Clipper equipped with floats, built by Mr. William Bibichkow.

Pict. No. 6. Hudsen Woeltgen and his beautifully designed "Flying Wing." Note the horn-shaped streamlining of the engine.

Pict. No. 7. A tense moment at the take-off of a plane during a Chicago contest. The ship didn't crash.



Pict. No. 10. Peter Bower's model of very clean design.



Pict. No. 11. Odell Reynolds' and Al Lewis' beautiful gull wing.

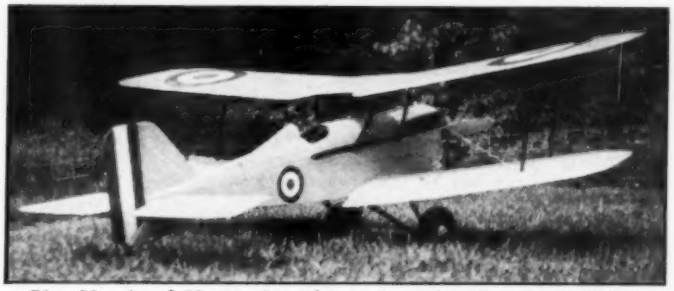
most successful and is one of the sturdiest ships he has ever built. He says:

"It has proved that it can take it, for it has had a lot of rough bumps and its share of accidents."

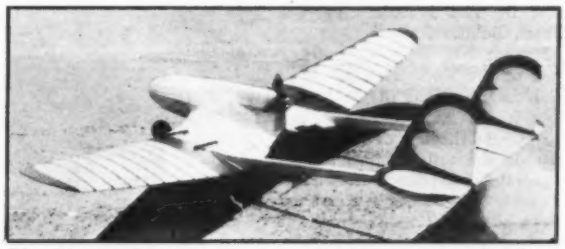
Not only that, Herbert has made some excellent flights. We will let him tell you about one:

"Last week I installed a lighter timer, made from a smaller alarm clock, and took the ship out to do some flying. After some 30 seconds flights I refilled the gas tank and set the timer for a 60 seconds flight. After watching her climb for several minutes I knew the timer had stuck; and my friends and I started out after it in a car. It was circling to the left, and as a fair wind was blowing it was gradually going cross-country. It got so high that we had to shut off the car engine and get out of the car and listen intently to hear the motor run. After about a 12-minute motor run she continued to circle and slowly glided to earth. We found her about 7 miles from the field. The total time of this flight was about 35 minutes. It had grazed a tree in landing and had a small tear in the wing, but she landed o.k. and was sitting on the wheels and skid when found. I have of course, removed the faulty timer and am going to install a more reliable unit."

The model weighs 4-3/4 pounds, which includes the timer, and is powered with a model "F" Baby Cyclone. Sam Poole of Monessen, Pa., a friend of Herbert's, also built a Cub from the same plane which weighs only four pounds, one ounce, ready to fly; and it has a much better glide than Herbert's plane. These two models are a little heavier than the original model from which the planes were made; it weighed only 3-1/2 pounds. Picture No. 1 shows Herbert's Cub. Judging from the photo he has done an exceptionally fine job of construction.



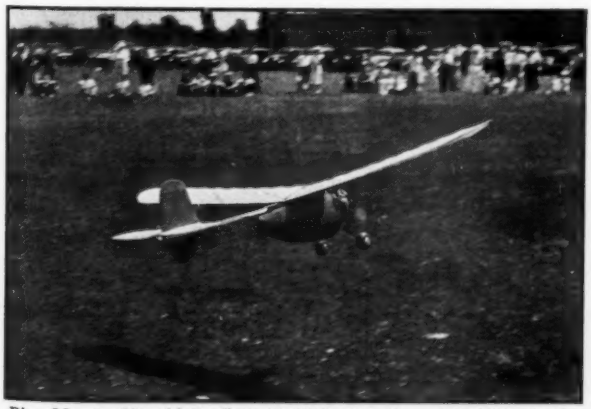
Pict. No. 4 and No. 5. A perfect scale model of an S.E. 5 built by Art Kronfelt. A fine flier!



Pict. No. 12. Contrary to custom, this low-wing is a fine flier. It was designed and built by S. E. Watson.

There was a rather tall, good-looking young man who helped materially by his genial smile and good humor in making the 1938 Nationals a success. This person is one Mr. Joe Ott of 2433 North Spaulding, Chicago, Illinois. Those who attended the contest will picture him with a camera glued to his eye, getting a photographic record of all that took place. We feel that he made a real contribution to the excellent spirit of the contest. Now he has been kind enough to send us a picture, No. 2, of Mr. Richard Obarski and the ship with which he won first place in the second annual Midwest States Contest, held August 4th by the Chicago Parks Department. Obarski is a member of the famous Aeronuts Club of this city. He won the meet with a flight time of 6 minutes, 55 seconds with a motor run of thirty seconds.

Gas motored seaplane models seem to have become popular. Here is another one, picture No. 3. It is a Comet Clipper built by Mr. William Bibichkow of 2509 Cermak Road, Chicago, Illinois. The floats were designed and built from specifications



Pict. No. 8. Harold Stoffer's "half fuselage" model. This design is unique—the tail being supported by a boom.

Pict. No. 9. Miss Grace Shrer gets her model off to an excellent start. Great practice for asthetic dancing; note the pose.

Pict. No. 15. A group of the 44 contestants who took part in the recent Hawaii contest.

supplied by the Edo Airplane Float Corportion. The gas model builders have finally turned to World War designs. It is strange that with all the progress in aviation that the old designs do not appear so much out-of-date. This is probably due to the fact that the improvements have been in details rather than in fundamental principles. Picture No. 4 shows a gas powered S.E. 5 built by Art Kronfeld of 430 Common Street, Belmont, Mass.

Picture No. 5 shows a close-up of the nose of the ship. Kronfelt built this ship from factory plans of the large plane. He says it was not necessary to make any changes in the length of the landing gear, size of the tail surface, amount of wing dihedral, prop diameter, airfoils, number of wing ribs or any other details. The wings are demountable, having fixed-length landing wires so that it is only necessary to tighten the flying wires in order to rig the wing. The model weighs three pounds ready to fly and is as stable as any monoplane. Kronfelt says his contest days are over and he now spends his time building custom gas jobs. We venture to say that his contest days are over only until he builds a custom gas job that will win a contest. Why not start with the S.E. 5?

Chicago Gas Model Contest

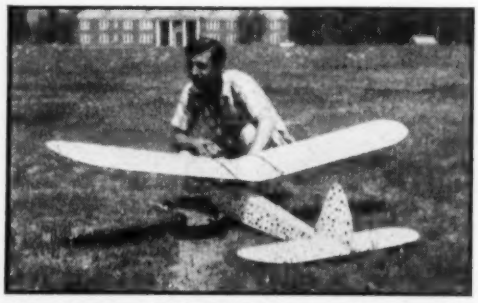
On July 24th the Greater Chicago Gas Model Meet, sponsored by Pat Sweeney and sanctioned by the NAA, was held at the Hines Airport near Chicago. 157 gas models were entered and less than ten of them failed to make official flights. Weather conditions were perfect the entire day of flying, which started at 10 A.M. and ended at 6 P.M. Members of the Chicago chapter of the NAA and a number of well-known men in model activities acted as timers and judges, making it possible for contestants to get official flights when they wanted them. The result was eight hours of constant flying and a swell time for everyone. Over $300 in model merchandise was awarded by Mr. Sweeney to the winners. The use of the airport was obtained through the courtesy of Colonel Hugh Scott, manager of the Edward Hines Hospital. Mr. Jack Vilas, president of the Chicago Chapter of the NAA, Aviation Post 651, The American Legion, the 108th Observation Squadron, Illinois National Guard, Major C. A. McElvan Comm., and the Chicago Girls' Flying Club all cooperated to make this meet a huge success—one long to be remembered by all participating.

Picture No. 6 shows Hudsen Woeltgen and his "flying wing" of very unusual design. This is not just another flying wing; refinements of design shown in the picture is an indication of the considerable thought and experiment which went into its creation.

Pict. No. 13. Martin Vier's tricky, speed racing gas job that has flown successfully.

Picture No. 7 shows a view of a tense moment in the life of a gas model builder. The ship has climbed in a steep bank and cut the corners of a catastrophe rather closely.

Picture No. 8 shows the take-off of Harold Stoffer's model of unusual design. Stoffer has reduced the weight by using an extremely short fuselage, in effect a nacelle, for the motor and a sufficient cross section to fulfill contest requirements. The tail is attached to the end of a boom which extends rearward from the upper part of the stubby fuselage. This type of design should be extremely popular as it gives promise of excellent performance due to its light weight.



Pict. No. 14. Frank Ehling nursing his baby KG which has developed a "case of measles." It flew in spite of it.

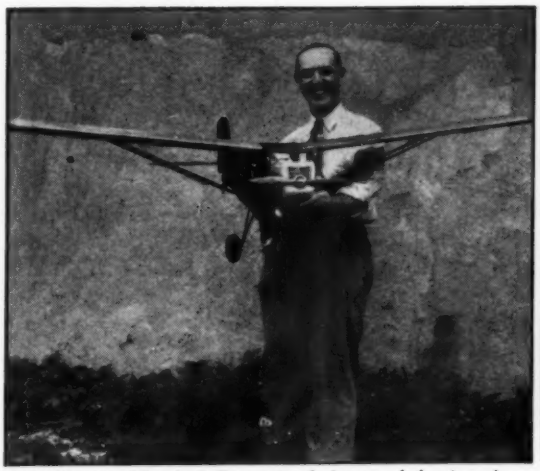
Picture No. 9 gives us a little action. It shows Miss Grace Schrer getting her plane off to a good start. For the young ladies who like thrills the sport of gas model aviation has no equal.

Picture No. 10 shows a model of exceptionally clean design. It was built by Mr. Peter Bowers of Los Altos, Calif., Box 357. You will note the airmail designation that Mr. Bowers has given his ship. He says:

"This is my ninth ship, which I designed along lines set down by Mr. Grant in his articles, as the 'Ideal Design.' I tried to combine good looks with strength and perfect design, and got every thing I wanted: although some in excess quantity. The ship was designed for a ten-ounce wing loading, but I got away from myself in building it and used such heavy wood that it ended up weighing three pounds, one ounce, or fourteen-ounce wing loading. Naturally the performance suffered, but not the strength.

"It demonstrated its ability to take it one day by hitting the hangar at the Moffett Field Airbase, gliding straight down-wind on an eighteen mile wind. (Checked by the weather department). It glides at approximately twenty, just a bit faster than I can sprint; so it hit squarely, doing nearly forty miles per hour. Believe it or not, not a thing, even the prop, was broken. Although it hit about one hundred fifty feet up the side, bounced, rolled down the sloping side; it took off and circled around and hit again; this time lodging in a rain gutter. I have witnesses and photographs of the incident.

"The ship itself is of all-balsa construction, 3/32" sheet being used throughout; which in turn is covered with silk, three coats of clear dope and two thick-sprayed coats of white lacquer. The striping is red Scotch Cellophane tape. The span is five



Pict. No. 19. Mr. A. I. Petersen, chairman of the American Legion Gas Model Airplane Club, with a scale Curtiss Robin gas model built by club members.

Pict. No. 18. "Hap" Russell and Johnny Martin, pilots of the flagship of the American Air Lines, discuss gas model problems with Irwin Ohlsson. They are ardent fans.

feet, the chord is eight and one-half inches and the airfoil is an N.A.C.A. M-6, which helps to give it some of the speed. The construction is all 'Stressed Skin,' there being no framework except the nine fuselage bulkheads and the ten wing ribs."

One of the foremost model clubs of the country is the Albuquerque Gas Model Association. We hear from Lee Erlandson, president, of 1124 East Silver Avenue, Albuquerque, New Mexico. He says:

"Since we have written you our membership has increased to twenty-four. We have several members from adjoining towns, and some of them come an average of forty miles to enter our contests. Our twenty-fourth member is Bob Ditmer, 1937 gas model champ of Denver, Colorado. Ditmer recently moved to Albuquerque.

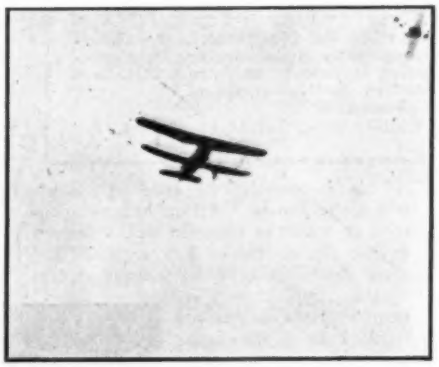
"Recent activities of the club include the construction of our own airfield, and several contests. We used to fly at a local airport but the hangars, etc. were just too big for some of the planes; so we decided to obtain a place where there would be no obstructions. The owner of an ideal piece of land readily let us use it and we got busy with a rail tied on the back of a car and leveled it off.

"Our latest contest was August 14th. The principal prize was the trophy donated by Mr. Russell F. Mead, Jr. This trophy must be won three times in succession before permanent possession. Ditmer came out on top.

"The gull wing job, picture No. 11, was made by Odell Reynolds and Al Lewis, and took third place."

As a general rule, low-wing gas models are considered to be tricky fliers. However, S. C. Watson of 204 East 1st Avenue, Mesa, Arizona, has had great success with his model, shown in picture No. 12. He says it is a consistent flier with forty-five consecutive flights to its credit. It is powered with a model "B" Brown Junior motor, and has a span of ninety-six inches, with 1413 square inches of area. The total weight is seven pounds, six ounces. Another unusual feature about this ship is its tricycle landing gear. This itself is unique; however, the plane embraces, as well an automatic balance mechanism attached to small ailerons on the trailing edge of the center section.

Here is what we call a real speed job—picture No. 13. It is Martin Vier's low-aspect ratio racer, which he designed. It is



Pict. No. 17. An actual picture of Burton DeMarais' biplane gas model in full flight. Some ship!

powered with an Ohlsson motor and has only twenty-nine inches wing span. He has had a successful flight with it, at which time it flew at a rate of between fifty and sixty miles per hour. Mr. Vier fails to give us more details as to whether or not it landed in one piece. He has our best wishes in this respect. Vier lives at 1001 Stratford Avenue, South Pasedana, Calif.

Picture No. 14 shows "old reliable" Frank Ehling of Jersey City, New Jersey, with his ship, which he flew in a recent contest at Staten Island, New York. In spite of a "case of measles" the ship flew very well. It did not win the contest but at least there is some excuse in this case, in lieu of its decoration. Frank says that every time he looks at it he sees spots in front of his eyes. Some plane! For the benefit of those who do not know Frank, we can say that he is a most consistent winner and "walks away" with a prize at nearly every contest which he enters. Evidently he has reverted to the old KG type of plane, for in effect the ship is a miniature of his model. The contest in which Frank flew this ship was the Richmond Model Flying Club Gas Model Contest, held on August 14th at Miller Field, Staten Island, New York. The events were: Endurance with a twenty-second motor run, the best of three flights winning; Pay Load with twenty-second motor run, formula of judging being wing load times seconds in the air; Spectacular or Stunt event; and an event in which Beauty of Design, Construction and Finish was the basis for winning. The Endurance event was won by Leon Shulman of New York City with a one-wheel gas model, plans for which appear in this issue. The ship has a climb like a skyrocket and stayed aloft for about seven minutes, after which it passed out of sight.

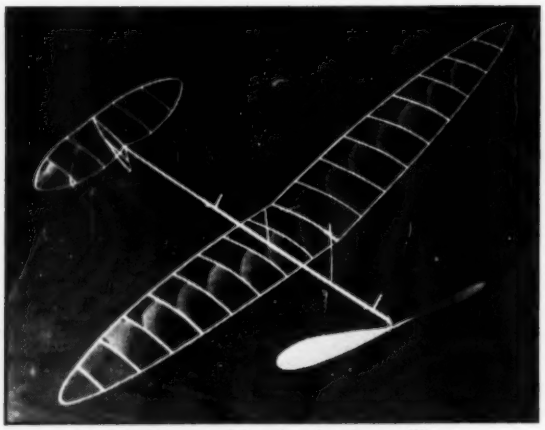
Hawaii is becoming gas model-minded in a big way. We hear from "Ace Stromberg of the 18th Air Base Squadron, Wheeler Field,, Oahu, Hawaii, concerning their first big contest. He says:

"The big contest is over and here I come through with the promised pictures of the event. Considering the limited knowledge of the contestants and the officials in reference to a contest of this kind, I feel that it was a huge success and I know that everyone was happy with the outcome.

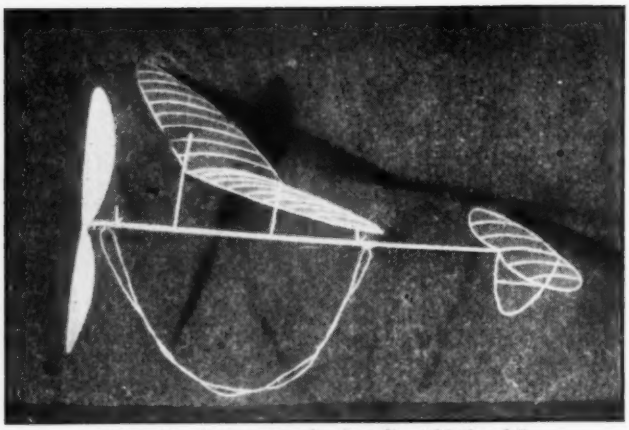
"The army was very gracious in offering assistance. The commanding officer of Wheeler gave us the complete use of the field,

(Continued on page 60)

Pict. No. 16. Judged the most beautiful plane at the Coupe de France gas model contest at the Caudron aerodrome.



Here's the record breaker for low ceilings



The ship that won at the Canadian "Nationals"

The Indoor "Stick" Canadian Record Holder

EVEN BETTER'N PLANNED—*After This Article Was Written*—

Wilbur Tyler flew the indoor tractor described and illustrated in the accompanying article at the 1938 Canadian Championship Model Airplane Meet sponsored by the Canadian National Exposition in Toronto on August 31st, to a first place and a new all-time high Canadian duration record of

15 minutes 26 seconds

in the Fort York Armories with an effective flying height of 50 feet. On this record flight the model was powered by the same size and length of rubber motor as called for in the chart in the article.

By WILBUR TYLER

LET'S state the case backwards—

ANSWER: The army wouldn't fly Martin Bombers in Madison Square Garden.

QUESTION: Why do model builders fly high-climb ships in low-ceiling armories and halls?

Experts agree that a specific type of design is required for the average contestant who does not enjoy the privilege of competing in large arenas. With the exception of the once a year Nationals, many builders never enter an indoor contest where the ceiling exceeds forty feet.

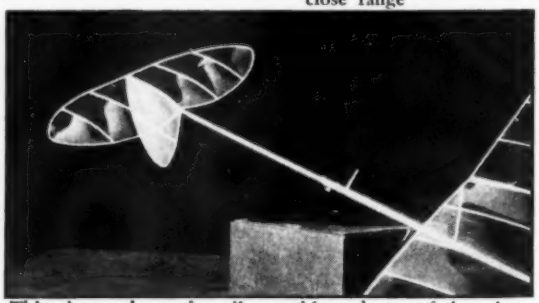
Do the gentlemen of the jury agree? Splendid.

This is particularly true in Boston where the Junior Aviation League sponsors as many as eighteen indoor battles during the course of one season. The many meets held in the low-ceiling Irvington Street Armory in Boston's Back Bay have resulted in a design being perfected by Leaguers with which the partially expert can consistently turn in ten-minute flights during cold weather.

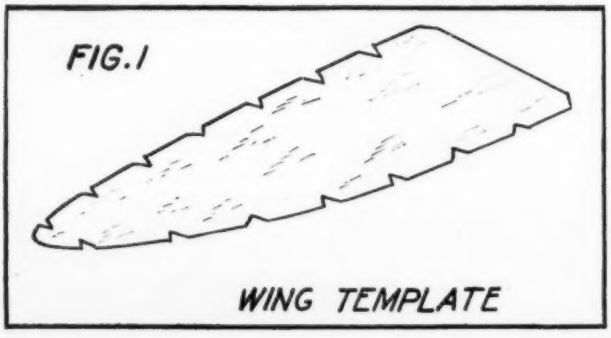
Realizing the fallacy of flying high-ceiling designs in low-ceiling arenas, this Class C tractor embodying many of the most recent refinements is presented to MODEL AIRPLANE

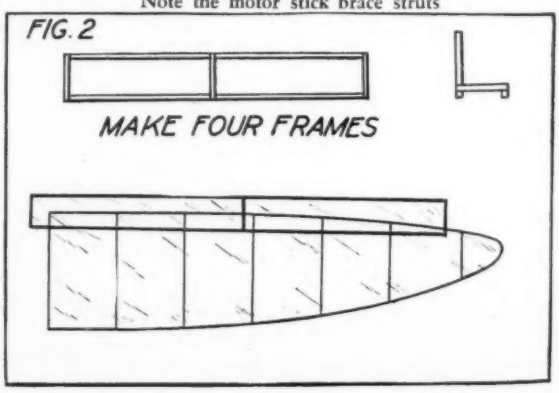
(Cont'd on page 46)

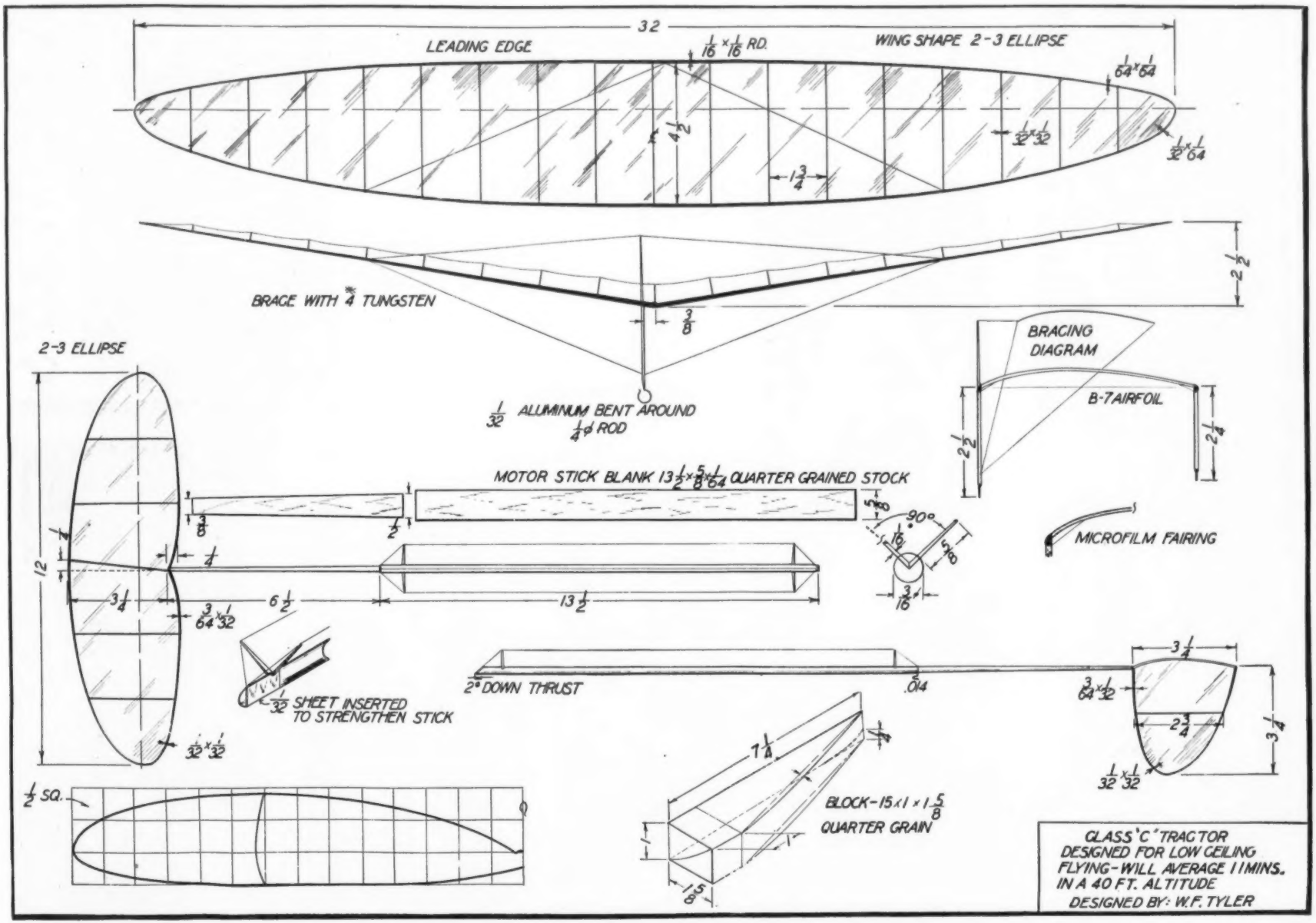
How the graceful wing assembly looks at close range



This picture shows the tail assembly and part of the wing. Note the motor stick brace struts






32
LEADING EDGE
1/16 x 1/16 RD.
WING SHAPE 2-3 ELLIPSE
1/64 x 1/64
1/32 x 1/32
1/32 x 1/64
4 1/2
1 3/4
2 1/2
BRACE WITH 1/4 TUNGSTEN
3/8
2-3 ELLIPSE
1/32 ALUMINUM BENT AROUND 1/4 ϕ ROD
BRACING DIAGRAM
B-7 AIRFOIL
2 1/2
2 1/4
MOTOR STICK BLANK 13 1/2 x 5/8 x 1/64 QUARTER GRAINED STOCK
3/8
1/2
5/16
90°
1/16
3/16
MICROFILM FAIRING
12
1/4
3 1/4
3/64 x 1/32
6 1/2
13 1/2
1/32 SHEET INSERTED TO STRENGTHEN STICK
2° DOWN THRUST
.014
3 1/4
2 3/4
1/32 x 1/32
1/2 SQ.
7 1/4
BLOCK-15 x 1 x 1 5/8
QUARTER GRAIN
GLASS 'C' TRACTOR
DESIGNED FOR LOW CEILING
FLYING-WILL AVERAGE 11 MINS.
IN A 40 FT. ALTITUDE
DESIGNED BY: W.F. TYLER

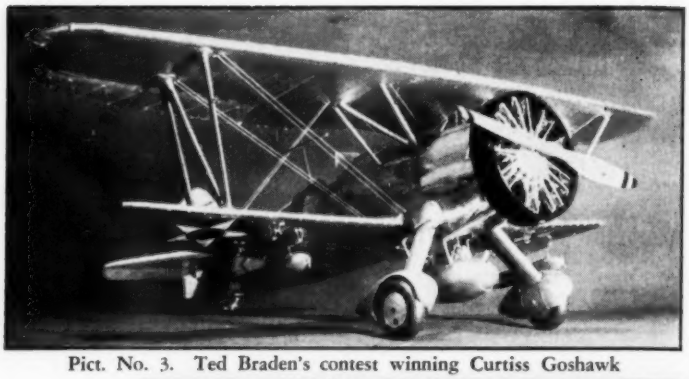
AIR WAYS

HERE AND THERE

What Readers Are Doing to Increase Their Knowledge of Aviation in All Parts of the World. Tell Others What You Are Doing

Air Ways Club News

Original Design Contest



Pict. No. 3. Ted Braden's contest winning Curtiss Goshawk

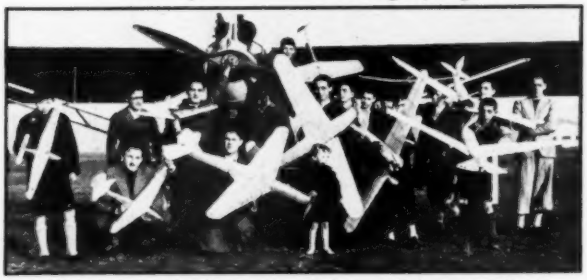
AMERICA wins the 1938 Wakefield Contest!! That is the biggest news that has struck the model game in some time. Brief highlights concerning this event were given last month; however we are in a position now to give you more details.

As many of you know, the contest was held on Sunday, July 31st, at the Caudron-Renault Aviation Field situated at Guyancourt, near Paris, France, and there were fourteen countries represented by teams. It was rather late in the day before the contest got well under way and unlike American contests, only one flier could fly at the time. Thus the flights extended over a long period of time. In determining the winners the man on any one team who had the highest average for three flights won for his team. At the end of the day it was found that the various countries placed as follows:

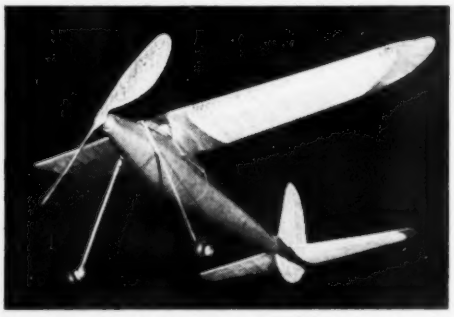
1. United States 10:54 seconds. Average time, 2. France 6:58 sec., 3. Germany 6:15 sec., 4. Sweden 6:7 sec., 5. Great Britain 5:57 sec., 6. Canada 4:56 sec., 7. South Africa 4:00 sec., 8. Australia, 9. Poland, 10. Belgium, 11. Holland, 12. Czechoslovakia, 13. Norway, 14. New Zealand.

Jim Cahill of 1419 North Gale Street, Indianapolis, Indiana, was the highest man on the U.S. team. Actually he made only one good flight; two of the flights were duds, so to speak. Nevertheless the one flight of 33 minutes, 54 seconds was fine enough to give him an average of 10 minutes, 54 seconds for three flights. This established him in first place. The country with the next best flight was France, with 6 minutes, 58 seconds; nearly four minutes less than Cahill's time! Cahill's machine finally flew out of sight of the timers and later was recovered at Trappes, about fifteen miles from its starting point. On this flight the machine climbed to an altitude of several hundred feet where it encountered a thermal, which carried it aloft to a greater altitude. The model which Cahill flew was the one with which he placed

Pict. No. 11. A beautifully constructed Miles Falcon model, built by H. F. Dare of Southgate, England



Pict. No. 9. Students at an Italian model plane school



Pict. No. 4. Q Wakefield model designed and built by Capt. Willis Brown

Pict. No. 5. Jim Frick and his Grant Wakefield model and smaller sport model

Pict. No. 6. The four first place winners of the Denny contest. L. to R.: The "Bullet," "Condor," "Skylark" and "Starling"

—30—

Pict. No. 1. The U.S. team at the Wakefield contest

Pict. No. 2. Jim Cahill preparing his plane for flight

Pict. No. 10. A well designed twin tractor by Mr. T. Newell, the first Wakefield winner

Pict. No. 8. Members of the first Philippine model plane club

Pict. No. 13. J. Meier's plane which wins the Original Design contest this month

Pict. No. 12. J. Meier and his plane

Pict. No. 7. C. Renning solving a problem

first in the 1938 National Elimination for the Wakefield team. It had a wing spread of 46 inches and a total wing area of 206 square inches. It weighed just 8 1/2 ounces.

The international contestants were treated royally while on their visit in France. On Saturday, July 30th, the French Committee for Model Aircraft, president of which is Michel Wibault, showed the contestants some interesting films in the construction of models. The models of the contestants were examined by the Aero Club of France in the afternoon, and in the evening the Aero Club gave a party for them. On the 31st the contest took place. Following the contest all the participants were given an elaborate dinner at one of the finest hotels in Paris, the Palais d'Orsay.

Members of the United States team were: James Cahill, Indianapolis, Ind.; James Bohash Jr., Detroit, Mich.; George DeLaMater, Oneonta, N. Y.; G. J. Wisniewski, Milwaukee, Wis.; Ted Just, Johnstown, Pa.; William Pfeil, San Antonio, Texas. This is the first time that America was represented by a full team. All the boys made the trip except Stiglmier: whose plane was shipped and flown by Ted Just. These boys remained several days after the contest and traveled into Belgium to participate in the national contest there. The participation and trips of most of these boys were made possible through the work of the National Headquarters of the NAA, assisted by local NAA leaders and Chambers of Commerce in encouraging financial underwriting of members' expenses by home-town civic leaders, and the staff of MODEL AIRPLANE NEWS. The latter organization made all final arrangements for the sailing of the contestants on the "President Roosevelt." William Pfeil did not arrive in New York in time to sail with the rest; consequently he sailed on the "Nieuw Amsterdam" and arrived in France on Saturday, July 30th.

Next year the Wakefield Cup will be flown for in this country and it is hoped that all Air Ways Club members will busy themselves with the design and construction of a superior Wakefield model so that we may keep the Cup here for a number of years to come. The Cup was established by Lord Wakefield of England in 1927 and was previously won by America in 1930, 1931 and 1935.

Picture No. 1 shows the members of the Wakefield team on the field just before the contest.

Picture No. 2 shows Jim Cahill winding up his ship for his record breaking flight.

One of the finest looking models of which we have received pictures this month is that of Ted Braden's Curtiss Goshawk. This is shown in picture No. 3, at the head of this article. Braden lives at 845 24th Street, South Bend, Indiana. This model took second place in a contest held near his home town, for which he was awarded a flying trip to Indianapolis and back. The model embodies navigation lights, moveable controls in the cockpit and shock absorbing landing gear. It appears that Ted had some trouble in running his aileron wires through the upper wing of his model. He says he would like to hear from some other fellow who has made biplanes with ailerons on the top wing only, so he can find out how to overcome this difficulty.

Picture No. 4 shows a very fine Wakefield model designed and built by Captain

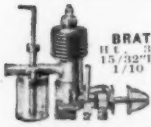
(Continued on page 55)

THE EAGLET

44" Wing
Flying Weight 17 ozs.
Truly the Finest Midget Gas Job Offered to the Gas Model Builder Today.
DESIGNED FOR USE WITH MIDGET GAS ENGINES

The trend in the size of gas models today is towards a ship of about three to four feet wingspan, and corresponding light weight. The "Eaglet" is the foremost exponent of this trend. This is just the type of model that any builder can fly in fields of restricted size. Model's design is so simple that even the novice will have no difficulty in assembling the kit parts.

$3.95 POST-PAID
Including M & M Wheels



BRAT
Ht., 3¼"; 15/32" Bore; 1/10 H.P.
Approx. 3 ozs.
$16.50 Postpaid

TROJAN
Ht., 3½"; ⅝" Bore; ⅛ H.P.
Approx. 4½ ozs.
$18.50 Postpaid

SYNCRO BEE
Ht. 3½"; 19" Bore: 1/10 H.P.
Approx. 4 ozs.
$12.50 Postpaid

M & M MOTOR
Ht., 3 5/8"; 21/32" Bore: ⅛ H.P.
Approx. 4 ozs.
$17.50 Postpaid

MISS AMERICA GAS MODEL
EVERY INCH A WINNER
NOW ONLY $7.50 P. P.

7 ft. Wing; Wt. (Less motor) 2¾ lbs.; 22 minutes on 1 oz. fuel; 18 to 1 Glide

This is the big red and blue gas model that is a reliable, consistent, flyer, repeatedly coming in among the winners. Almost every month you will hear and read of new records being made with a "Miss America" gas model. In design, in accuracy, in detail, in completeness, it represents everything a gas model should be. The shock-proof landing gear, brackets, balance tabs on rudder, and stabilizer for correct adjustments of flight, and new type battery box, are only a few of the many features in this striking gas model. It is built for either Brown, Ohlsson, Mighty Midget, Syncro Ace, or other reliable motors now on the market.

Kit is 100% complete, including all parts, 3½" pneumatic wheel, colored dopes, full size plans, etc., etc. At the old price of $9.50 NOW ONLY $7.50 P.P.

THE STREAMLINER

Wingspan 6 Ft. Length 43" Weight (less motor) 2¼ lbs.

This new type Gas Model is remarkably true to Big Plane scale and still retains contest model performance. In test flights it has shown unusual efficiency and proven itself repeatedly. It is absolutely correct in aerodynamic design and constructed to withstand hard shocks incident to gas model flight. It is practically crashproof. Has detachable wing, adjustable rudder control, and stamped nose cowling which completely hides engine—with hinged hatch for accessibility.

COMPLETE KIT with Ready-made balsa ribs with notches for spars, Stamped Metal nose cowling with engine hatch, liquids, all balsa cut to correct sizes, nuts, bolts, electrical connections, celluloid, rubber, bamboo paper, large full size detailed plans giving every bit of information needed for building and flying the "Streamliner" with instructions for installing any type gas engine.

Complete kit, less wheels, at your dealer or direct, only..... **$4.95** Postpaid

Complete kit, including a pair of 3½" pneumatic rubber air wheels, only... **$5.95** Postpaid

THIS MODEL HOLDS CHAMPIONSHIPSHIP OF FRANCE WITH A FLIGHT OF 1 HOUR 20 MIN.

RED ZEPHYR
PROFESSIONAL GAS MODEL

NOW ONLY $4.95 POSTPAID (Less Wheels)
With 3½" Pneumatic Rubber Wheels $5.95 postpaid

THE BIGGEST KIT VALUE EVER OFFERED

Seven Red Zephyrs entered at National Contest by Iowa Model Club

MISS PHILADELPHIA
8 Ft. Wingspan; 57" Long; Weight (Less motor) 3½ lbs. Flies one hour on 1 oz. of gas. Gliding angle app. 25 to 1.
A Sensational Prize-Winning Model

If you want to enter the contest with a duplicate of the model that has come out ahead of the crowd in every major gas model competition in recent years, or if you want a beautiful model for sport flying, this is the model for you.

Kit is 100% complete, including ready shaped leading and trailing edges, with notches for ribs; ready made balsa ribs with notches; pair of Scientific 3½" pneumatic rubber wheels; full size plans.

$9.95 Postpaid. Less motor

1938 MODEL YEAR BOOK—BY ZAIC
By Far The Best!
160 pages of priceless data and plans, almost 100 detailed drawings of up-to-the-minute models. Every gas model fan should have a copy.
Only $1.00 Postpaid

STORAGE BATTERY FOR GAS MODELS
Smallest storage battery ever produced

When fully charged will provide power for 30 flights. It can then be recharged to its original voltage and repeat this service. Packed in carton with bottle of distilled water and recharging bulb.

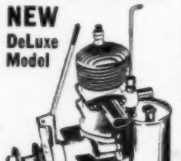
Price **$2.50** Postpaid

SYNCRO ACE
$13.75 Postpaid
⅞" Bore, 15/16" Stroke, 1.5 H.P. 5,000 R.P.M.

Forster's "Little Hercules"
Bore 1-1/16", 1.3 H.P. Bare Wt. 14 ozs. Stroke 1⅛"
Two piston rings. Ht. 3-7/16"
Model "B" Air Cooled **$17.75**
With Ball Bearings **19.50**
Prices are postpaid.

DENNYMITE GAS ENGINES

NEW DeLuxe Model



With aluminum outside exhaust, dural mounts, superior coil and condenser, outside control spring choke.
Complete engine..... **$17.85 Postpaid**

STANDARD MODEL
As illustrated above, with coil & condenser. Does not include brackets, spring choke, or down draft exhaust..... **$15.85 Postpaid**

ENGINE UNIT
Less coil and condenser **$13.85** postpaid.

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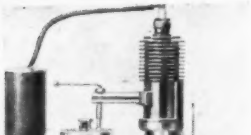
BROWN Jr. ENGINE MODEL D $10 POSTPAID



⅞" Bore
Ht. 4½"
1" Stroke
1/5 H.P.
1200 to 10,000 R.P.M.
Weight, ready to run with gas, two batteries & propeller: 20½ ozs.

In less than four months close to 10,000 of these Brown Jr. engines have been sold! Complete with coil, condenser, instructions and double guarantee. Only $10.00 Postpaid.

MODEL "B"
Long famous for power, smooth running, and high compression. Piston ground and lapped to perfect fit. Highest quality gas engine obtainable.
$21.50 Postpaid

BROWN Jr. "M" Marine Complete $15.00 Postpaid

EVERY MOTOR TESTED AND GUARANTEED

BUNCH MOTORS

All Bunch engines full 1/5 H.P. at 5200 R.P.M.; ¼ H.P. at 8500 R.P.M.; Bore ⅞"; Stroke 13/16"; Bare weight 6½ ozs.

Engines assembled and block tested, or kits are complete with coil, condenser, fuel tank, and Champion spark plug. Engine kits supplied with piston, piston rings, and main bearing fitted, ready to run, and with timer assembly set up and points adjusted, so that the engines can be assembled and tested within one hour's time.

MIGHTY MIDGET Upright Assembled	$ 9.50
MIGHTY MIDGET Upright Kit	7.85
MIGHTY MIDGET Inverted Assembled	9.75
MIGHTY MIDGET Inverted Kit	7.85
GWIN AERO Upright Assembled	12.00
GWIN AERO Upright Kit	9.85
GWIN AERO Inverted Assembled	12.50
GWIN AERO Inverted Kit	9.85
MIGHTY MARINE Assembled	12.50
MIGHTY MARINE Kit	10.85

All prices are Postpaid.

FREE true-pitch propeller, oil, and instruction manual. All motors and motor kits carry the Scientific Double Guarantee.

DEALERS: Write on your letterhead today for wholesale prices on SCIENTIFIC'S FAST-SELLING line of kits and supplies.

SCIENTIFIC

SCIENTIFIC WHEELS
Absolutely pure tureproof—for use with models of 4 to 8 foot wingspan.
Per Pair $1.50 P.P.

SCIENTIFIC FINISHES For Gas Models
Clear Dope, Colored Dope, Thinner, Cement, Heavy Cement, Bamboo Cement, Banana Oil
3 oz. bot..... $ .25
½ pt. can..... .35
1 pt. can..... .75
1 qt. can..... 1.40

TINY-TOT-TIMER

CYCLONE NEEDLE VALVES
Each ..... $ .50

$2.50 each Postpaid

NEEDLE VALVE AND BODY
For Brown, Mighty Midget, Ohlsson, Brat, Trojan, M & M, Syncro, etc. Metering type wanted.
Needle Valve..... 50c
Body 10c

SCIENTIFIC MOD

218-220 MA-11 Market Street *"GAS MODEL*

In England: Model Supply Stores, 17 Brazennose St., Manchester
In Australia: Swift Model Aircraft, 158 Adelaide St., Brisbane, Queensland

...NTIFIC
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...s Models ...pe, Colu... ...ltiner, C... ...leary C... ...amboo C... ...anana Oil ...t..... $ ...n..... ...

...OT-TIMER ...LONE ...VALVES $ ...

...2.50 each Postpaid

...VALVE ...BODY ...n, Midg... ...Ohlsson ...an, Mid-M... ...Me... ...te. ...wanted. ...alve... ...

...OD ...MODEL ...UARTERS"

...seensland

MODEL SUPPLIES

HOOK UP WIRE 5 ft. 20c

CHAMPION SPARK PLUGS

Each..... 65c

WRENCH SET 25c

VALVO-LINE OIL

Finest quality SAE-70 for all gas engines. Large bottle with instructions..... 20c

AUTHORIZED DISTRIBUTORS for M&M PRECISION MODEL WHEELS

1¼"	pr.	$ .50
1⅜"	pr.	.50
1½"	pr.	.50
1¾"	pr.	.50
1¾"	pr.	.60
2"	pr.	.60
2⅛"	pr.	.60
2⅜"	pr.	.60
3⅛"	pr.	1.50
3½"	pr.	2.75
4½"	pr.	2.75

EXHAUST MANIFOLD

For Midget & Brown.. $1.00

TAIL WHEELS

1"	pr.	15c
1⅛"	pr.	18c
1⅝"	pr.	20c

KNIFE SWITCHES

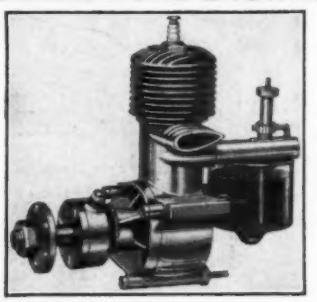
2-pole	25c
3-pole	35c

BRACKETS Per pair, complete ..50c

ORDERING INSTRUCTIONS

Add 15c to orders up to $1.50. Over $1.50 add 10% for all orders of $4 or over sent postpaid.

OHLSSON Model "23" SMALL BORE ENGINE



A rugged baby brother of the famous Ohlsson Gold Seal Motor—only 3-9/16" high, but packed with more power, speed, and stamina than any other motor for its size on the market. The Ohlsson "23" has plenty of power to fly a 3 lb. model, yet is small enough to fly a 20 oz. job—in other words it's the perfect "5½" for every small ship. Like its big brother, the Ohlsson "23" is built from the finest materials money can buy, and is assembled and tested under the rigid supervision of the same men who have made Ohlsson motors first choice with model fans the world over.

Compare the Ohlsson "23" part by part with any other motor of comparable size on the market—and we'll let you be the judge!

SPECIFICATIONS

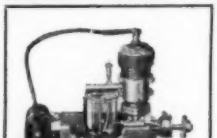
Horse power 1/7; Stroke 3/4"; Bore 5/8"; Bare engine weight, only 4½ ozs.; Height 3-9/16". Mounting—combination radial or lug. Dural I-Beam connecting rod. Bronze Bearings. Carburetor—special needle type mixing valve. Crankshaft—½" machined from solid stock. Timer—fully enclosed, adjustable. Smith ignition coil. Spark plug—Champion ¼" x 32". Gas tank—special clear transparent composition. The fact that all parts are completely interchangeable makes replacement easy and economical. Ohlsson motors operate upright or inverted. Order your Ohlsson "23" engine now for immediate delivery. Complete with coil, condenser, etc.

Pretested and Fully Guaranteed

$16.50

POSTPAID

Scientific Double Guarantee.



OHLSSON GOLD SEAL MOTOR

N. P. ½
Bore 7/8"
Stroke 15/16"
500 to 10,000 R.P.M.
Bare Wt. 8 ozs.

Ohlsson Gold Seal miniature motors are built to give that extra margin of performance between an ordinary motor and a champion! The combination of the finest raw materials plus the most skilled engineering in the industry produces in Ohlsson Miniature Motors a degree of performance that is seldom equalled and never exceeded. Every Ohlsson Motor is a Champion from the first turn of the prop—that's why model builders everywhere enthusiastically endorse Ohlssons. Order yours today! Complete, including Coil, Condenser, Special Design Propeller, Oil, and Double Guarantee.

Only $18.50 Postpaid

AIRPLANE CO.

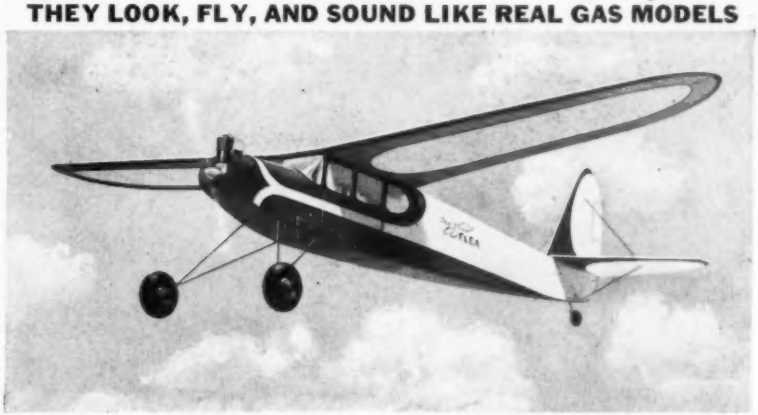
NEWARK, N. J.

In Finland: O-Y Wiklund, Turku, Abo

In Portugal: Ed Von Hafe, Rua Dr. Miguel Bombarda, 243, Porto

All the thrills of gas model flight!

THEY LOOK, FLY, AND SOUND LIKE REAL GAS MODELS



THE FLEA

Wing ..... 36"
Length ..... 28"
Weight ..... 4 oz

FLIES 1 MILE (5280 FT.)

This new type of model airplane developed by Scientific will give you all the thrills and excitement of building a real gas job. Thousands of builders have constructed these remarkable models and gotten truly exceptional flights. Build one yourself now and experience the fun you, too, can have with a fine flyer!

The Flea kit is absolutely complete, containing all balsa parts cut to size, dummy gas engine and spark plug, ball bearing washer, rubber bum ratchet device, insignia, rubber, metal parts, liquids, full size plans with explicit instructions. Complete, including a pair of M & M pneumatic rubber wheels.

$1.95 Postpaid

Jim Clark's FLEA

FLIES 10,000 FEET FOR WORLD'S RECORD

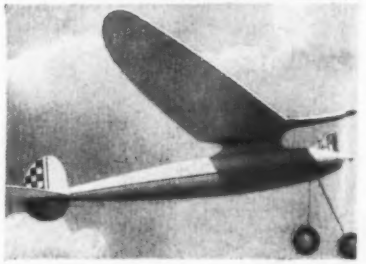
Akron, Ohio

Dear Sirs:

My Flea model flew for a distance of 2 miles, or about 10,000 ft.! I had launched the model after using a winder and it climbed like an elevator, nosing up steeply but without stalling for a single second.

I thought the model would never come down, but it did eventually and after much running I managed to be on hand when it landed. A perfect flight if there ever was one.

My models from now on will always be Scientific Flyers. I am enclosing a photo of my Flea model.



VALKYRIE GAS TYPE MODEL

Wingspan 24" Length 15" Flies ½ mile

Designed by Indoor Expert Carl Goldberg in miniature duplicate of his prize winning original which won second place at the "National," Detroit, 1937. Can be easily constructed in 4 or 5 hours. Sturdily built with all latest features. Complete kit contains all parts with all balsa accurately cut to correct size, dummy gas engine, motor bum ratchet device, wheels, full size plans with all necessary instructions for building and flying. Complete

$1.00 Postpaid

"FIREFLY"

Wing 36", Length 28", Wt. 4 ozs.

FLIES 1 MILE (5280 Feet)

You will surely want to build one of these new models. The "Firefly" is the next best thing to a genuine gas model. It is just the model for those desiring to gain experience before tackling a real gas model. Its advance clean design and beauty will startle you and when you take it out to the flying field we suggest you bring a car along because you may have to chase it into the next county. Think of it—your own gas type model that will soar majestically aloft, steady and graceful as an airliner under expert command! Kit includes dummy motor, propeller, full size plans, and a pair of M & M pneumatic rubber wheels.

$1.95 Postpaid

SEE THE FLEA, VALKYRIE AND FIREFLY MODELS AT YOUR DEALER TODAY!

SCIENTIFIC'S WORLD-FAMOUS "SCIENCE-CRAFT" GUARANTEED KITS

These are the most complete and detailed models on the market for the money. The kits are 100% complete with many finished parts,

50c Each Postpaid

BOEING FIGHTER 50c
MONOCOUPE 90A 50c
WACO F-S 50c
WACO CUSTOM CABIN 50c
CURTISS HELLDIVER 50c
WACO D 50c
CURTISS HAWK P6E 50c
MR. MULLIGAN 50c

RED FLASH

Ready-to-Fly MONOPLANE

18" Wingspan

A complete, ready-to-fly Cabin Monoplane—nothing to build—all you have to do is slip the wing into the slot at the top of the fuselage, wind the prop, and she's away like a dart! Takes off from the ground just like a real plane and flights of over 1,000 feet are common. Has hardwood propeller and crash proof landing gear. Packed well in partitioned box, **Postpaid, Only**.....

$2.00

CONSTRUCTION KIT complete with all parts die cut to shape—no cutting necessary. Everything comes completely made, ready for assembling.

Complete kit, postpaid, Only.....

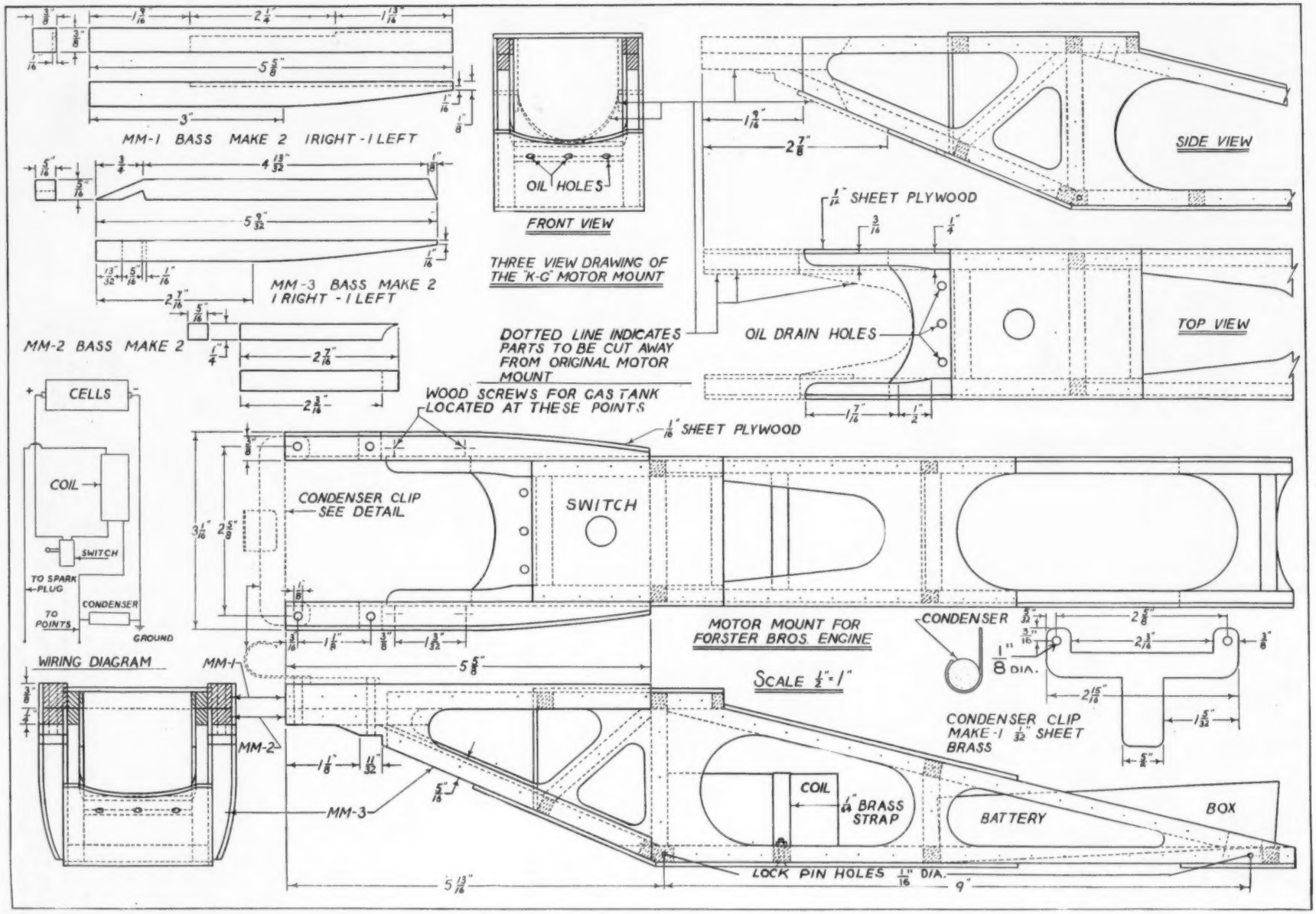
$1.00

FRANK HAWK'S NORTHROP GAMMA

Weight only 11½ ozs. Complete kit with full size plans including ready made balsa cowling and wheels. At your dealer or sent postpaid, only $1.00.

MR. MULLIGAN

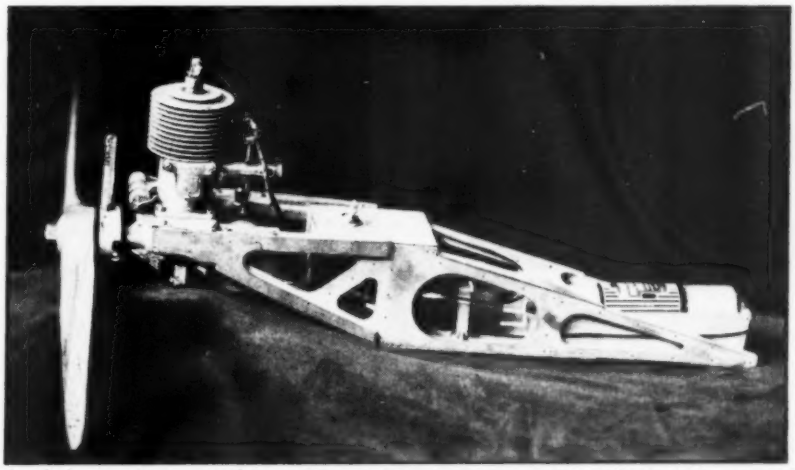
Winner of Bendix and Thompson Trophy Races. Movable controls, bridge-type landing gear. 100% complete kit. Postpaid, only $1.50.


MM-1 BASS MAKE 2 IRIGHT - I LEFT
MM-3 BASS MAKE 2 I RIGHT - I LEFT
MM-2 BASS MAKE 2
FRONT VIEW
OIL HOLES
THREE VIEW DRAWING OF THE "K-G" MOTOR MOUNT
SIDE VIEW
TOP VIEW
1/16" SHEET PLYWOOD
OIL DRAIN HOLES
DOTTED LINE INDICATES PARTS TO BE CUT AWAY FROM ORIGINAL MOTOR MOUNT
WOOD SCREWS FOR GAS TANK LOCATED AT THESE POINTS
CELLS
COIL
SWITCH
TO SPARK PLUG
CONDENSER
TO POINTS
GROUND
WIRING DIAGRAM
CONDENSER CLIP SEE DETAIL
SWITCH
MOTOR MOUNT FOR FORSTER BROS. ENGINE
SCALE 1/2" = 1"
CONDENSER
1/8" DIA.
CONDENSER CLIP MAKE-1 1/32" SHEET BRASS
MM-1
MM-2
MM-3
COIL
1/4" BRASS STRAP
BATTERY
BOX
LOCK PIN HOLES 1/16" DIA.

More Power for Your "KG" Gas Job

How You May Convert Your Old KG Motor Mount to Carry a 1/3 HP. Engine That Doubles the Performance of Your Plane

By JESSE DAVIDSON



A 1/3 hp. engine mounted in a KG motor mount; converted to withstand the greater power. The engine bearers have been placed farther apart

BY WORD of mouth and photographs received it is quite evident that the good "old reliable" KG gas model (plans published in April-May 1935 issues) still rates high with the many model builders throughout this country and abroad. Ships built three years ago, and veterans of occasional crackups, still turn in splendid performances. Other large ships, similar in basic design and construction to the KG, are now being built to take engines of higher power rating than their present power plants. The plan shown on the opposite page illustrates in detail the best method of mounting a Forster Brothers 1/3 horsepower engine. This engine is at present the most powerful of the popular priced type and is increasingly finding its way to the engine mounts of the larger ships for both experimental and radio-controlled craft.

It will be recalled that the motor mount of this type is held securely in position by lock pins which are thrust through bulkhead stations numbers 1 and 3. These simple locking devices hold the roaring engine very effectively.

The model builders who find they can employ this type of mount for their particular kind of ship can devise similar lock pins, providing, of course, the bulkheads upon which the engine mount rests can be designed to receive such a mount. The position for the lock pins are shown on the plan. In any event, it will be wise to have the May 1935 issue of M. A. N., or reprint of the KG plans, handy. A comparative study of both mounts will be quite helpful.

Where an original KG mount is available and the desire to use a Forster engine is in view, builders will find the necessary changes can be accomplished in a short time. On the other hand, builders desiring to mount the Forster on this specially designed mount may proceed by constructing the hook-up according to the plans and dimensions given on the drawing. The

(Continued on page 40)

The Messerschmitt BF-109 Fighter

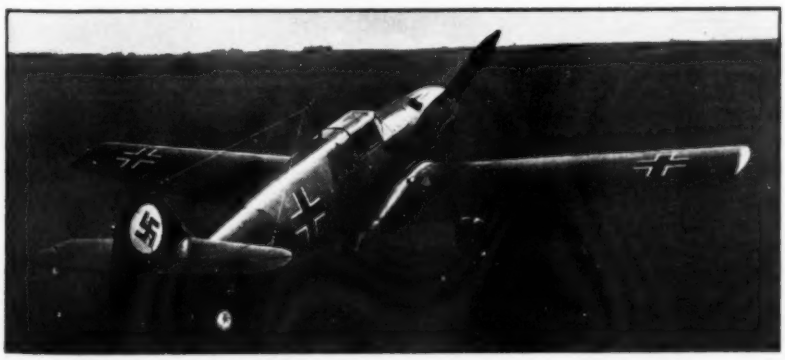
The Plane on the Cover

By ROBERT McLARREN

"NOR shall it construct, purchase or in any manner sustain an air force or aeroplanes with military capacities or of belligerant importance." Thus reads an obscure paragraph in the famous Locarno Treaty of 1925, the peace pact between the participant nations of the World War. And thus sounded the death knell of Germany's once powerful air service.

Dark days followed; days of humiliation, internal strife, riot, disorder and appalling defencelessness. Then came Der Fuehrer, the Nazi regime, the rise of German power and, three years ago, the flagrant violation and subsequent denunciation of the Locarno pact. Today Germany boasts a powerful navy, a huge standing army, and a deadly potent air force. Her numerical air strength stands fourth among the nations of the world, TWO notches above our own air service! Fighters and bombers have rolled from her factories in steady streams and her borders are now literally darkened by the shadows of her aerial armadas.

Not only has Germany built her own air force into a monster of strength and power but she has consigned hundreds of planes to General Franco in the Spanish holocaust. Heinkels, Junkers, Buckers, Henschels, Arado's, B.F.W.'s and Focke-Wulf's ride wing to wing with evil gun snouts protruding pugnaciously from cunningly concealed implacements. Tremendous weight-carrying ability has been built into the huge Junkers bombers; visibility into the Henschel scout planes; fighting ability into the Dornier seaplanes.



The Messerschmitt BF-109 fighter at one of Germany's flying fields

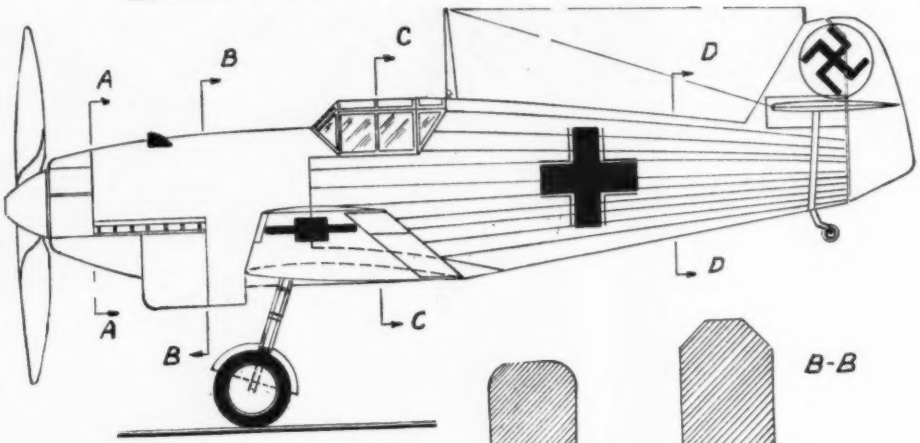
But Air Minister and "Number Two Nazi" Herman Goering did not stop there. Speed was the single item omitted from his air squadrons. And when he demanded speed in a fighting ship he not only got a great deal of it but he received the fastest landplane in the world! the Messerschmitt M-109.

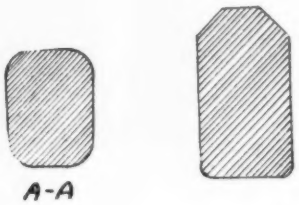
The prototype of this amazing machine, the BF-109, was designed and constructed in the Dessau experimental plant of the B.F.W. aero company. After its astonishing performance was witnessed, the brothers Messerschmitt of Berlin purchased the rights to the ship and rechristened it the M-109. It is now going into full squadron production and nations the world over are shuddering at the prospect of such a plane in mass formation!

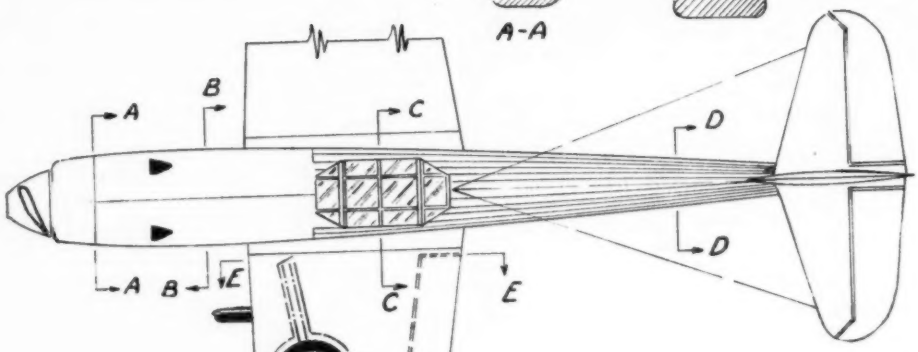
Construction follows familiar lines with

(Continued on page 38)

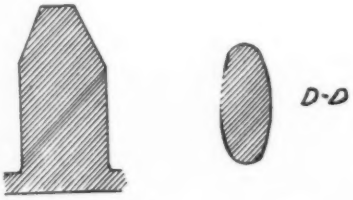
MESSER SCHMITT BF-109

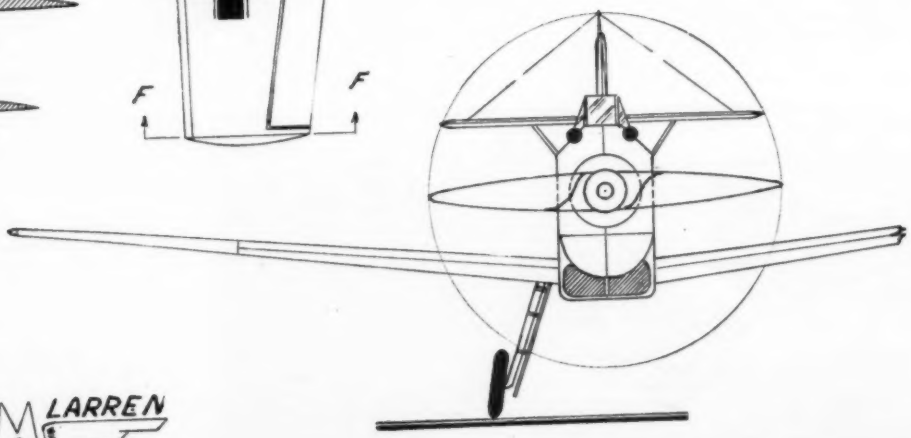






SCALE
1/50TH FULL SIZE





ROBERT M. LARREN

Far Superior ... and too fast for competition!

BUNCH MOTORS and MODELS LEAD THE WORLD

Launching the realistic 24" Sea Hornet speedboat provides real excitement. The trim, nautical Sea Hornet merits acclaim as a model you can be proud to build and own. It's thrilling high speed performance will make it your favorite gas model.

Mighty Marine Speedboat Engine

Over land and water the superior performance of Bunch products reflect the ingenuity of men who make new things possible. There are faltering imitations but Bunch alone **covers** the gas model field—periodically setting a higher standard of performance.

Any body of water is your flying field with a seaplane. Ready to take off this 57" Scorpion Gas model with land gear removed is equipped with the Gull Float Gear. Positive water stability is achieved with the three float design. Bunch kits to easily build Scorpion gas models and the Gull Float Gear include the best of materials, complete flying instructions and open a new field of gas model operation.

Mighty Midget Aircraft Engine

Gwin Aero Aircraft Engine

Power Ported BUNCH MOTORS

SPECIFICATIONS

All Bunch Engines full 1/5 h.p. at 5200 R.P.M.; ¼ h.p. at 8500 R.P.M. Bore ⅞". Stroke 13/16". Bare weight 6½ oz. Engines assembled and block-tested, or kits are complete with coil, condenser, fuel tank and Champion spark plug. Engine kits supplied with piston, piston rings and main bearing fitted ready to run. Also timer assembly set up.

☐ MIGHTY MIDGET Upright Assembled	$ 9.50
☐ MIGHTY MIDGET Upright Kit	7.85
☐ MIGHTY MIDGET Inverted Assembled	9.75
☐ MIGHTY MIDGET Inverted Kit	7.85
☐ GWIN AERO Upright Assembled	12.00
☐ GWIN AERO Upright Kit	9.85
☐ GWIN AERO Inverted Assembled	12.50
☐ GWIN AERO Inverted Kit	9.85
☐ MIGHTY MARINE Assembled	12.50
☐ MIGHTY MARINE Kit	10.85

Bunch GAS Powered Models

☐ Sea Hornet Speedboat Master Kit	$11.50
☐ Scorpion Senior Gas Model Master Kit (for inverted engine)	10.50
☐ Scorpion Major Gas Model Master Kit (for upright engine)	10.50
☐ Gull Float Gear — Master Kit	6.75

CHECK THIS COUPON!

For prompt delivery include postal money order and mail to Bunch Model Airplane Co., 5009 S. Hoover St., Los Angeles, California. Prices postpaid.

Name.....

Street.....

City..... State.....

BUNCH MODEL AIRPLANE CO.
5009 So. Hoover St. • Los Angeles, Calif., U.S.A.

British Agents: Model Supply Stores, 17 Brazennose St., Manchester

IMPERIAL LEADS

24-Hour Service

Gas Model Supplies at CUT PRICES

BROWN, JR. MOTOR "D" NOW $10

18" BALSA

1/16x1/16 100, 5c
1/16x1/8 35 for 5c
1/16x3/16 18, 5c
1/16x1/4 15 for 5c
1/16x1/2 5 for 5c
3/32x3/32 30, 5c
1/8x1/8 30 for 5c
1/8x3/16 12 for 5c
1/8x1/4 10 for 5c
3/16x3/16 8, 5c
1/4x1/4 6 for 5c
1/4x1/2 3 for 5c
1/4x1/2 2 for 5c
1/64x2 4 for 10c
1/32x2 8 for 10c
1/16x2 8 for 10c
3/32x2 7 for 10c
1/8x2 6 for 10c
3/16x2 3 for 9c
1/4x2 3 for 10c
3/8x3/8 1 for 2c
3" sheets or 36" lengths, double above prices; add 10c for pkg. chge. for 36" lengths.

18" PLANKS

1x1 5c; 1/2x2 6c
1x1 1/2 9c; 1x2 10c
1x3 15c; 2x2 18c
2x3 25c; 2x6 30c
3x3 40c; 3x6 75c

SHEETS 12"x2"

1/16 or 1/32 10 for 10c
1/8 8 for 10c
1/4 3 for 7c
3/32 8 for 10c
3/16 3 for 7c

BAMBOO

1/16 sq. x12, 36, 5c
1/16x1/4x15, dz. 10c

CLEAR DOPE OR THINNER

5c per oz.; Large bottle, 8c; 1/2 pt. 30c; 1 pt. 45c

COLORED DOPE

6c per oz.; Large bottle 10c.

CLEARCEMENT

5c per oz.; Large bottle, 8c; 1/2 pt. 35c; 1 pt. 55c

PROPELLERS

Balsa	Paul-O-Mash. Cut	Wina
5"	4c	10c
6"	5c	15c
7"	6c	20c
8"	7c	25c
9"	8c	30c
10"	8c	35c
12"	10c	45c
14"	14c	
15"	15c	60c

RUBBER

.045 ..... 25 ft. 5c
1/16 sq., 15 ft. 5c
1/8 flat ....15 ft. 5c
Skein 50c
3/16 .....10 ft. 5c

RUBBER LUBRICANT

Large bottle....10c

BAMBOO PAP'R

White....2 for 15c
Red or yellow .....15c each

PNEUMATIC AIR WHEELS

3 1/2" .....pair 1.50

SPRING STEEL WIRE

1/16 dia. 5 ft. .12
3/32 dia. 5 ft. .15
1/8 dia. 5 ft. .25

5-FOOT BALSA

1/8x1/8 30 for 20c
1/8x3/16 12 for 20c
1/8x1/4 10 for 20c
3/16x3/16 8 for 20c
1/4x1/4 6 for 20c
1/4x1/2 3 for 20c
3/8x3/8 1 for 8c
1/2x1/2 2 for 20c

For 5' lengths add 25c pckge. charge. Specify whether you wish balsa for rubber-powered or gas models.

Double Balsa prices for Spruce, Basswood, or Pine.

DURALANGLES

1/8x1/8 per ft. .15
3/8x3/8 per ft. .22

BRASSANGLES

1/4x1/4 ft. 25

STREAMLINED ALUM. TUBING

1/4x1/8 ft. 15c
5/16x5/32 ft. 16c
3/8x3/16 ft. 18c

SPARKCOIL!.50

GAS FUNNEL with strainer .30

FLIGHT TIMER

50 Sec..... .50
0 Sec. to 1M. 2.00

DURALTUBING

1/4 dia. ft. .14
5/16 dia. ft. .20

Your choice of one of these **FREE OFFERS** with all orders for $1.00 or over

F R E E

1. Large bottle clear cement and 60 1/16 x1/16x18 balsa
2. 2 pr. 1 3/8" Birch Wheels
3. 3 sheets silver tissue
4. Membership Pin in IMPERIAL MODEL CLUB which entitles you to 5% discount on orders of $2.50 or more

WOND. WATER SPRAYER 15c

WHEELS per pr.

Brch	Blsa	Celu
1/2	.01	.03
3/4	.02	.04 .05
1	.03	.05 .07
1 1/4	.04	.08 .10
1 1/8	.07	.10 .16
3	.15	.15 .30

SHEET ALUM.

.0004x5x11 1/2 2 sheets 3c
.005 in. 6x6 5c
.010 in. 6x6 6c

THRUST BEARINGS, dz.

Sm. 10c; lge. 15c

PROP BLOCKS

1/2x3/4x5 6—5c
1/2x3/4x6 6—5c
5/8x1x7 4—5c
5/8x1x8 3—5c
3/4x1 1/4x10 3c ea.
3/4x1 1/4x12 3c ea.
1x1 1/2x12 4c ea.
1x1 1/2x15 7c ea.

SANDPAPER

Doz. sheets.....5c

BUSHINGS

1/16.....4 for 1c

FREE POSTAGE on all orders in U.S. Add 10c packing charge on all orders (large or small) in U.S.; Canada, U.S. possessions, and foreign, over $1.00 add 15%. Foreign, under $1.00, add 15c. No C. O. D. Mo stamps.

NOSE BLOCKS

1x2x1..... 1e
2x2x1..... 2e
2x2 1/2x1..... 3e

TISSUE, AA

All col., doz. 19c
Silver .....ea. 5c
Superfine, wh. 5c

ALUM. TUBING

1/16, 3/32, 1/8 ft. 7c
5/16, 3/8, ft. 10c

WIRE

6-8-10-12-14
2 ft.....1e

20 IN. FLYING PLANS 10c—3 for 25c

Sparrow Hawk, Boeing Trans. 247, Spad Chass., Vought Corsair, Curtiss Swift L. W. Waco Cabin Biplane, Doug'as Dolphin, Boeing P12F, Fokker D-VII, S.E.5, Goshawk, Gee Bee, Boeing P26A, Monocoupe, Northrop Gamma, Fairchild 24 Cabin, Corben Super-Ace.

SELECT ANY 3 OF THE ABOVE PLANS in 20" FLYING KIT POSTPAID 35c

Dealers: Send for Wholesale Price List

Send 10c for Complete 16-page Illustrated Catalog

Price list of model airplane and boat supplies, 3c postage

IMPERIAL MODEL AERO SUPPLY

416 M McDonald Avenue Brooklyn, N. Y.

The Messerschmitt BF-109 Fighter

(Continued from page 35)

the exception of several new aerodynamic details heretofore untried on high speed fighting craft. The original B.F.W. BF-109 was of all-metal construction, the fuselage being built up of steel tubing, fabric covered aft of the metal engine cowl. The later Messerschmitt model featured all-metal monocoque construction with a stressed skin covering. The wing is of the low-wing cantilever design and is equipped with Handley-Page slots on the outer leading edge and trailing edge flaps. The entire rear section of the wing is hinged, the outer portion operating reciprocatingly as ailerons, the inner portion being utilized as landing speed decelerators. Little use has been found for slot adaptations on high speed craft, but the amazingly low landing speed of 44 miles per hour can be directly attributed to this safety application. Full control at and below the stalling speed is thus assured. Control surfaces are fabric covered, fin and stabilizer being of sheet covered metal construction. All surfaces are balanced for light control at high speed.

The retractable landing gear is of the single-strut cantilever type and swings outward and to the rear on a semi-bevel principle.

Operation is hydraulic with safety alternation of mechanical manipulation.

The power plant is either the cleverly designed Junkers "Jumo 210" engine, which features six cylinders and twelve pistons in vertical arrangement and develops 640 horsepower, or the giant Daimler-Benz, inverted "V" twelve-cylinder liquid-cooled motor of 950 horsepower. The coolant is carried through a huge tunnel radiator just under the nose. The propeller is the British V.D.M. controllable pitch airscrew and features a comparatively large blade area as compared with our American metal props.

The pilot is located high and well forward in a completely enclosed pit. The sturdy mast just above his head serves a dual role as radio aerial post and safety brace in the event of a nose-over in a bad landing. Complete sending and receiving radio equipment is carried. The tail wheel is a standard pneumatic swivel design and is unretractable. Armament aboard the BF-109 consists of the deadly 23 millimeter Madsen cannon mounted to fire through the hollow nose spinner and four 50 caliber machine guns mounted in pairs in each wing panel outside the propeller arc. Four bombs of small capacity are carried in racks under the belly.

The BF-109 (or M-109 if you choose) made its bow to the world by garnering all honors at the 1937 Zurich International Air Meet held in the northern Switzerland community. Five fighting craft were submitted by three nations and took part in the military competition.

First event was a speed race over a closed course of 31.4 miles which was covered four times. Germany's Herr Werner Franke, flying a BF-109 powered by the 640 horsepower Junkers "Jumo 210" captured this event going away in the fast time of 29.6 minutes, or an average speed of 254.54 miles per hour. Next event was the climb and dive competition in which the pilot must take off from a standing start, climb to 9,840 feet (3,000 meters) and return to a "low altitude," which means anything under 1,000 feet. Herr Franke stepped into his BF-109a (with the huge Daimler-Benz 600 engine of 950 horsepower) and did the trick in 2 minutes, 5.7 seconds.

Third and most gruelling event was the Circuit of the Alps for military aircraft. This was a 228 mile course starting at Dubendorf and contacting Thun, Bellinjona, and thence back to Dubendorf. The BF-109 triumphed in both classes: the event for single ships and that for the formation groups of three. Major Seidemann, piloting the powerful BF-109a model, captured the former event in 56 minutes, 47.1 seconds for an average speed of 241.3 miles per hour. A few minutes later Captain Restemier led a flight of three of the smaller BF-109 standards over the course and won the event in 57 minutes, 7 seconds for 233.5 miles per hour average.

These officially timed speeds would credit the BF-109 with a top speed in excess of 260 miles per hour—and this, oddly enough, equipped with either the 640 or 950 horsepower engine; proving again the unreliability of factual data. However, the Messerschmitt M-113, a standard M-109 fighter redesigned for racing, recently broke Howard Hughes' two year old landplane speed record with an officially timed straightaway wash of 379.66 miles per hour.

This ship used an even larger Daimler-Benz engine and was considerably lightened and reconstructed for the attempt. All of which would prove to us that although Germany's new Messerschmitt has a top speed of around 380 miles per hour, her air corps version has nothing approaching that figure for a top speed.

On his recent tour through Europe, Major Al Williams was accorded the exclusive privilege of being the only pilot outside the German Air Force to fly the Messerschmitt. His enthusiasm for the ship was unbounded and he comments: "With years of single-place fighting ship experience behind me, I believe the Messerschmitt is the fastest and most maneuverable fighting plane in the world!" Which would place the BF-109 ahead of such famous ships as the British "Hurricane" and "Spitfire" models, France's latest Nieu-

MARPELL—Streamlined Gas Model Wheels

Designed For Perfect Landings

When your gas model . . . new and shining . . . comes gliding in it creates a prompt stir of interest—that pleased expectancy of a perfect landing.

Safeguard your ship at this thrilling instant with Marpell wheels of exclusive streamlined RAISED-TREAD design. Truly light weight Marpell tires are vulcanized of the highest grade ebony-finished rubber. The hub is of heat treated, highly polished duraluminum with a bronze bearing. A patented "Air-Check" inflation valve holds air pressure indefinitely. Inflating adapter furnished.

We Have No Dealers

Send postal money order direct. Please do not send checks.

$2.00 Your choice, 4 1/2" or 3 1/2" diam. Bronze bearing fits 1/8" axel. Per pr., either size.....

Postpaid in U. S. California Buyers add 6c State Sales Tax.

Tail Wheel Included

A new streamlined tail wheel of live rubber will be included with your order. This is not a fat, spongy, do-nut type tail wheel, but is really streamlined with a molded-in bronze bearing.

MARPELL SUPERIOR PRODUCTS CO. 8406 Victoria Ave., Los Angeles

Sensational in Price! Sensational in Value! C-D Makes another outstanding contribution to the Gas Model World with its New High Climb

CLEVELAND CLOUDSTER

(A REAL HIGH CLIMBING "CLOUD TICKLER")

SORRY we're still unable to show its picture this month but you can take Cleveland's word that it's a honey. Looks something like the beautiful C-D Authentic Rearwin over at the right except it has dihedral and no wing struts, it's an eyeful of sleek, speedline beauty and an absolute world beater in value. The brilliant all red Cleveland Cloudster is a cabin monoplane that will instantly win the hearts of experienced gas modelers, and yet is easy enough for beginners to construct. Big 50" span, and 31" length—designed for motors up to ¾" bore. Very simple to build—and it has that realistic look that so conspicuously marks all C-D models. You'll be proud to call it yours. Adjustable wing, stabilizer and rudder. Climbs and glides beautifully. Kit contains all necessary balsa, printed easy-cut ribs, etc., full size drawing, gas tissue, celluloid, shaped leading edge, all strip wood, music wire, nuts, bolts, washers, etc.—everything except cement, dopes, wheels and power unit. At this remarkably low price, every one can build a gas model—so don't delay ordering your Cloudster—send your order today (if your dealer hasn't it in stock)—we'll rush your Kit to you postfree.

Kit GP-5004, only..... $2.50

(If you want us to include all necessary dopes, cement and M & M Gas Model wheels, with your order, add $1.75 to above price.)

(Dry kits mean no cements or dopes included)

SPAN 64½" REARWIN SPEEDSTER DRY KIT GP-69 $4.85

C-D's REARWIN and STINSON Attract Unusual Praise

Ideally Suited to Radio-Control Work
For Which Purpose It Is the Most Popular U. S. Gas Model

These two really authentic gas models are standouts wherever gas models are shown or flown. Prize winners in contest after contest—on flights and looks! Each is packed with authentic, easily made detail. STINSON RELIANT—Dry Kit GP-66, postfree, only $8.50 (82" span). REARWIN SPEEDSTER—Dry Kit GP-69, postfree, only $4.85 (64½" span). In accordance with C-D's gas model policy, the motor unit with propeller, wheels and wheel shoes are not supplied with Kit (this gives model builders their choice on these items). Extra parts to complete GP-66 (except power unit) $3.95; extra parts to complete GP-69 (except power unit) $3.55. Add 85c to either parts Kits (or $1.50 with dry kits) if you wish 3¼" M & M's, instead of wood wheels, or $2.10 for 3½" M & M's.

Save Up to 33⅓% on C-D Rubber Driven Models

Complete Your Thompson Trophy, Lineup—1938 Winner Ready Soon!

1938 TURNER'S SILVER "COMET"—ORDERS TAKEN NOW. SF-72 KIT $1.75. DWARF DRY KIT D-72, 50c.

1929 Travel Air—Dry Kit SF-2 (span 21¾") formerly $2.35, now $1.75. Dry Kit D-2 (span 14½") formerly 65c, now 50c.

1930 Laird Solution Racer—Dry Kit SF-46 (span 15⅞") formerly $1.95, now $1.50—Dry Kit D-46 (span —") formerly 65c, now 50c.

1931 Bayles' GEE-BEE—Dry Kit SF-17 (span 17⅛") formerly $1.95, now $1.50. Dry Kit D-17 (span 11⅜") formerly 65c, now 50c.

1932 Doolittle's GEE-BEE—Dry Kit SF-27 (span 18⅝") formerly $1.95, now $1.50. Dry Kit D-27 (span 12⅛") formerly 65c, now 50c.

1933 Wedell's Wedell-Williams—Dry kit SF-47 (span 19½") formerly $2.35, now $1.75. Dry Kit D-47 (span 13") formerly 65c, now 50c.

1934 Turner's Wedell-Williams—Dry Kit SF-48 (span 19½") formerly $2.35, now $1.75. Dry Kit D-48 (span 13") formerly 65c, now 50c.

1935 "Mister Mulligan"—Dry Kit SF-52 (span 23⅝") formerly $2.75, now $1.75. Dry Kit D-52 (span 15¾") formerly 65c, now 50c.

1936 French Caudron Racer—Dry Kit SF-63 (span 17") formerly $1.95, now $1.50. Dry Kit D-63 (span 11⅜") formerly 65c, now 50c.

1937 Folkert's Special—Dry Kit SF-71 (span 12") formerly $1.95, now $1.50. Dry Kit D-71 (span 8") formerly 65c, now 50c.

GR. LAKES SP. TRAINER

Dry Kit SF-1 (span 20") formerly $1.95, now $1.50. Dry Kit D-1, (span 13⅜") formerly 65c, now 50c.

DOUGLAS TRANSPORT

Dry Kit D-55 (span 42⅝") formerly $3.75, now $2.50.

CURTISS HAWK P6-E

Span 23⅝". Dry Kit SF-21, formerly $2.50, now $2.25. Dry Kit D-21 (span 15⅜") formerly 95c, now 85c.

HUGHES USED THIS EXCELLENT DESIGN (MODIFIED) ON HIS WORLD-CIRCLING FLIGHT

LOCKHEED ELECTRA

Span 27⅝". Dry Kit D-65 (no liquids), formerly $2.75, now $1.95

NEW C-D P26-A FIGHTER

Dry Kit SF-60 (no liquids), Span 21", formerly $2.65, now $2.25

Dry Kit D-60 (no liquids), Span 14", formerly $1.10, now $.85

New Low Prices on C-D R.R's.—On All Types Supplies and Parts Too.

Send Us Your Gas Model Orders.

Trade in your old gas motor. Ship it to us securely packed with all accessories and we'll quote you on any new motor of your choice. It is not necessary that you accept if you do not desire. Send stamped self addressed envelope for quotation or whatever make used engine desired. All carry brand new motor guarantee.

Brown Jr. Model D Postfree	$10.00
Brown Jr. Model C Postfree	17.00
Brown Jr. Model B Postfree	21.50
Synero Ace Motor, postfree	13.75
Synero Bee Motor, postfree	12.50
Ohlsson Motor, postfree	18.50
Standard Airstream Dennymite Motor, postfree	15.85
Above Motor (S.A.Dennymite) less coil and condenser	13.85
De Luxe Airstream Dennymite, incl. Duraluminum Mount, Etc., postfree	17.85
All motors complete as usual, except S.A.D. as indicated.	
Cadet Starter, only	3.00
S.A.E. 70 Oil, 2 oz. 15c 1 pt.	.55
Br. Jr. Exhaust Manifold	1.00
Br. Jr. Spark Coil	3.50
Smith Coil	2.50
Lightweight Coil	1.45
1 Minute Timer (1 oz.)	1.95
AC Spark Plug ⅜-24	.65
Condensers (finest make)	.15
Toggleswitch	.50
Knife Switch SPST	.25
Tip Jacks, each	.09
Tip Plugs Solderless, each	.09
Bamboo Tissue 24 x 36	.08
Wheel Shoes, Balsa (3¼ wheel)	.95
3½ M & M Pneumatic Wheels	1.50
3½ & 4½ M & M Wheels, pr.	2.75
3½ x 1⅜ Balsa Wheels, pr.	.65
1/8x1/2x1/16 Alum Angle, ft.	.15
3/4x3/4x1/16 Alum Angle, ft.	.20

C.D. Utility Props—9"-10" 11"-12"-13"-14" each	.50
12" Laminated Props (special) varnished	.98
Varnished Gas Model Props	
9-in. .75; 10-in. .75; 11-in. .85; 12 in. .90; 13-in. .95; 14 in.	.95
Grade "A" Silk sq. yd.	.50
Grade "AA" Silk, sq. yd.	.80
Striping Tape, 10 ft.	.10
Brass Collars with Set Screw, 1/8, 5/32, 3/16, 7/32 holes, each	.10
Cleveland's Super-quality Liquids: Balsa Cement, Paper Cement, Anti-Blush Thinner and all colors of Dopes. 1 oz.	.10
2 oz.	.18
1/8 pt. (4 oz.) .55; 1 pt (16 oz.)	.95

—And many other parts, Cements and Dopes in bulk. 3 and 5 ft. wood, music wire, large sheets thin plywood, celluloid, etc., etc., parts—P'kg. and Shipping charge 15c.

SPECIAL 5c PRICE ON NEW C-D CATALOG

to readers of MODEL AIRPLANE NEWS. Greatest hobby book available. Covers gas models, rubber driven models. R.R.'s, ships and all varieties of hobby supplies. Surprisingly low prices. Don't wait—send for your copy today sure.

ORDERING INSTRUCTIONS: All direct orders subject to our regular shipping terms. Send check or M.O. (cash at own risk). No C.O.D.'s. To U.S. Possessions, Canada and British Isles, add 10% extra; all other countries, 20%, except those which have a transit charge add 40%. Include 5c for our New BIG 64 pg. Catalog.

DEALERS: Get in on the "big prosperity push"! C-D's new low prices put new pep and life into Kit sales. Act at once—wire or write for full details.

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FOR HEAVY GAS MODELS

WHITFIELD'S AMERICAN STAR BRAND XLCR MADE IN U.S.A.

BAM-BOO TISSUE

Colors: Natural, Red, Yellow, Blue and Green—all brilliant

Ref. from Phila.: "We have run tests on Star Brand AMERICAN BAMBOO PAPERS and find them far superior to any that come from Japan. Panels covered with the paper have been tested for resistance to punctures with falling lead shots. In every case we had to drop the weights twice as far on the AMERICAN paper as on the Japanese. Furthermore, the new paper presents a smoother surface, dopes nicely and does not have objectionable fibers raised above the surface."

JAPANESE TISSUE

Brilliant

THIN AND STRONG

AA In 32 Colors AA

JAP PROPS

STANDARD TYPE

BROAD BLADE
50% More Efficient

STEEL TYPE

MINIATURE CELLULOID MOTORS

4 sizes: 1½"; 2"; 2½"; 3"

Another Japanese Import

These lightweight motors have been designed to our specifications. Every detail of the original radial engine has been accurately reproduced even to the cowl plate at the front. They are a distinct improvement over any other dummy motor. At Whitfield's low price, they can be easily included in every flying model kit.

We Pay Shipping Charges

WHITFIELD PAPER WORKS

76 VARICK ST. NEW YORK CITY

Established 1869

port fighter, Russia's Z.K.B. 19 (I.17) (MODEL AIRPLANE NEWS, September 1938 issue) and Uncle Sam's 300-mile-per-hour Seversky, Grumman, and Brewster (MODEL AIRPLANE NEWS, October 1938 issue) fighting ships.

Comment reaches us from the other side of the Messerschmitt's business end in the reports of Frank Tinker, Jr., who spent a hectic year fighting for Loyalist Spain. "It was best at outdiving our ships," he says concerning the Messerschmitt fighters which opposed him and one of which downed "Whitey" Dahl, who is still a Franco prisoner. "It was highly streamlined and its pilot's usual tactics were to toss in a short burst and dive away from the fight. Our planes (Russian adaptations of American P-12's) could out-speed and out-maneuver the German monoplane."

More Power for your "KG" Gas Job

(Continued from page 35)

dotted lines shown in the top view of the original KG Brown mount indicates the parts to be cut away, thus making room for additional bracing.

With the exception of the plywood veneer, the entire mount is made of assorted sizes of bass. Assuming one is building the converted mount, instructions are given as follows:

Parts MM-1 to MM-3 inclusive are cut perfectly to the dimensions given. Perfect fitting parts make sturdy mounts. The first step is to attach MM-1 into position with casein glue. This glue is used throughout. Members MM-2 and 3 are next glued into position and set aside to dry for an overnight period. In the interim, all plywood patterns may be cut to the required shape and the brad positions marked off as shown. Note the oil drain holes in the under portion of the plywood covering.

The plywood coverings over sections MM-1-2-3 are next to be glued into position. After several hours nail in the required brads. Later, after parts dry thoroughly, drill 1/8" diameter holes for the engine tie-down bolts.

The condenser clip is cut to the design indicated from 1/32" sheet brass and is curled, as shown, to hold the condenser quite snugly. This fitting is placed directly over the engine bed itself just before it is to be bolted down. Then the bolts are placed in position, thus holding the clip tightly.

The bottom of the battery box is cut from 1/8" bass; front and rear ends from 3/16" bass and the sides from 1/16" plywood. Built to the design shown it is held together with glue and small brads. Positive and negative brass contacts are held in position with brads.

The fully detailed wiring diagram clarifies the hook-up situation. Make certain that all wiring and soldered joints are firm and secure. Before attaching the engine and wiring hook-up it is advisable to give the entire motor mount two coats of pure shellac.

The Physics of the Airplane

(Continued from page 13)

force and the center of rotation. In simple mechanics this may be defined as:

Torque = applied force × linear distance from center of rotation.

In aeronautics, the torque is defined as the turning moment developed in the opposite direction to propeller rotation which is caused by the rapid rotation of the propeller. Torque may be counteracted by rigging the wings at alternate angles of incidence or else by offsetting the vertical fin. The torque increases with an increase in the revolutions of the propeller per minute. This is substantiated by the axiom that the greater the angular acceleration, the greater the amount of torque. Torque is one of the bugaboos of small racing aircraft which have a diminutive wing area combined with high wing loading and enormous power. The problem of how to nullify the effects of the torque is serious. Where high horsepower outputs have been employed, such as in the Macchi-Castoldi Racer which flies at 440 m.p.h., a novel idea of twin propellers rotating in opposite directions by an ingenious coupling of two in-line engines together, has been used successfully. Torque may also be deleted by offsetting the wing to the opposite side of the longitudinal axis of an airplane. This generates a reacting moment to the torque by means of an unequal disposition of the lift forces acting on each side of the wing. The torque acts in airplanes with high horsepower and small wing spans as a force which tends to roll the whole machine, and that is why it must be dampened out by suitable means.

The torque of a propeller in pounds feet is equal to:

$$\frac{33{,}000 \times \text{H.P.}}{2 \times 3.1416 \times \text{r.p.m.}}$$

To offset the torque force, the balance of the airplane about its longitudinal axis must equal the torque generated by the propeller rotation.

Rotary inertia is a property of a mass in opposition to its being subjected to circular rotation or acceleration. This property is influenced by the manner in which the material of which the mass is composed is distributed about its center of rotation. Note that this is different than in the case of a mass undergoing sudden horizontal translation, because, in this case, the inertia of the mass is proportional to the mass of the body. Therefore, in the design of counterweights which are used to balance radial engine crank-shafts, it is expedient to set the weights at the end of a long segment of the crank-shaft so that the rotary inertia of the counterweight is as large as possible. Thus any tendency to slow down or decelerate is greater than if this mass were disposed close to the axis of rotation of the crank-shaft. See Fig. 2. This principle also governs the operation of the tachometer case. The rotary inertia of the small weights causes the instrument to slightly lag when the engine is throttled for an instant. The gyroscope has a rotating mass in which the properties governing rotary inertia are translated into directional stability.

"Too Many RECORDS"

You will find many claims of official gas model records. So many planes claim the world record that you are probably baffled as to what the record really is. None of the records compare with the 4¾ hour verified flight made at Denver two years ago in an N.A.A. limited fuel contest with a stock "Buccaneer" model that already had 200 flights to its credit. Under the new rules, the "Buccaneer-Standard" holds the official Senior N.A.A. record for 30-second motor run, made by Harold Johnson of the Queen City Model Club.

FLASH!!

"Buccaneer-48" wins SMALL-BORE CHAMPIONSHIP. Powered with Ohlsson "23" motor, this ship turned in a 2 min., 16 sec. flight on a 18-sec. motor run to win Quaker City Championship Contest.

$2.95 P.P. IN U.S.A.

The "BUCCANEER-48"

48" Wingspan For engines up to 1/7 h.p.

The newest model for small-bore engines from the famous line of "Buccaneers." Entirely new in construction, it has more strength for its weight than any model ever designed. Add to this, the experience gained by flying "Buccaneers" for nearly four years and you have the first perfected small-bore model. The kit has the completeness of all Berkeley Gas Model Kits. Full size plans, printed wooden parts, cement, colored dope, hardware and ignition equipment. Everything to build the model as pictured except wheels and power plant.

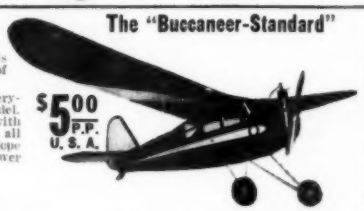
Official N.A.A. Record Holder
5½-Ft. Wingspan. For 1/6 to ¼ h.p.

Wherever gas models are flown, you will find this snappy ship standing out in the crowd because of its brilliant performance.

No model builder finds it hard to construct. Everything you desire in a small high-powered gas model. No kit at even several dollars more can compare with it for completeness. Kit includes full size plans, all wooden parts printed out, and three colors of dope (Your Choice). Complete kit less wheels and power plant $5.00 P.P. in U.S.A.

$8.50 P.P. in U.S.A

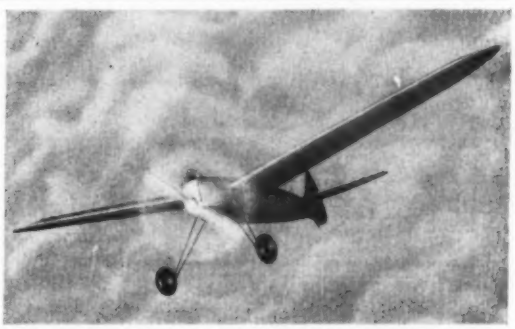
The "Buccaneer-Standard"



$5.00 P.P. U.S.A.

The "SUPER-BUCCANEER"

I.G.M.A.A. Record Breaker 7½ Ft. Wingspan—57½ minutes official on 2 min. engine run. Winner of over 100 contest prizes. No engine is too powerful for this rugged supership. Kit includes full size plans; wooden parts printed out; hardware and ignition equipment; pint cans of cement and colored dope; everything to complete the model as pictured except wheels and power plant.



The "COURIER-SPORTSTER"

6 ft. Wingspan For 1/6 to 1/4 h.p.

$5.95 P.P. in U.S.A.

Within three weeks after this kit was introduced, reports reached us of ½-hour flights and sensational average time on limited motor run. You want this ship for its beauty and contest performance. Kit is complete with full size plans, printed wood and everything to build the model as illustrated, including colored dope. Wheels and power plant are not included.

The "CAVALIER-STANDARD"

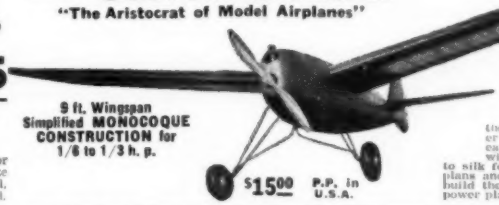
6 FT. WINGSPAN—FOR 1/5 TO 1/4 H. P. MOTORS

The very latest gas model kit for the larger model motors. Designed after hundreds of requests for a smaller version of the famous "Custom-Cavalier." Absolutely the fastest climbing model ever designed. It will outclimb some of our modern military aircraft! Kit is complete with full size plans, printed wood and everything to build the model as illustrated, including colored dope. Wheels and power plant are not included.

$5.95 P.P. IN U.S.A.

THE "CUSTOM-CAVALIER"

"The Aristocrat of Model Airplanes"



9 ft. Wingspan Simplified MONOCOQUE CONSTRUCTION for 1/6 to 1/3 h.p.

$15.00 P.P. in U.S.A.

THE SOARING CHAMPION

Flew for 291¾ minutes at Detroit Nationals (144¾ minutes official before disappearing from the airport) and 11½ hours at Seversky Field, L.I., each time on only a 30-second engine run. The design makes it possible for this ship to rise on thermal current that would not help smaller ships. Also flown radio controlled, easily carrying three lbs. extra weight with only ⅛ h.p. Kit is complete even to silk for covering, "pearlene" dope, full size plans and all wood printed out. Everything to build the model as pictured except wheels and power plant.

BERKELEY APPROVED MODEL MOTORS

Choose your motor from the approved list and be assured of satisfaction. Every motor sold with a 60-day guarantee. Immediate delivery from our stock, the largest in the East.

BROWN JR MOTOR

MODEL "D" $10.00 PP

Model "C"	$17.00 P.P.
Model "B"	21.50 P.P.
OHLSSON GOLD SEAL	**$18.50 PP.**
OHLSSON "23" - -	**$16.50 PP.**
"BANTAM" MOTOR -	**$16.50 PP.**
"M & M" MOTOR - -	**$17.50 PP.**

BERKELEY "Stop-Watch" FLIGHT DURAL TIMER

Now you can install a "Stop-Watch" Timer in your lightest gas model at no increase in price. New dural timer weighs only 1⅛ oz. Adjustable with split-second accuracy up to 55 seconds.

NOW $2.00 P.P.

BERKELEY PROPELLERS

Standard propellers are mahogany stained and varnished. DeLuxe Propellers have metallic finish. Every propeller is perfectly balanced by new machine method.

	Standard	DeLuxe
10" dia. (8" or 10" Pitch)	$ .50	$ .85
12" dia. (8" or 10" Pitch)	.60	1.00
13" dia. (8", 10", or 12" Pitch)	.70	1.15
14" dia. (8", 10", or 12" Pitch)	.75	1.25
15" dia. (8", 10", or 12" Pitch)	.85	1.35
16" dia. (8", 10", or 12" Pitch)	1.00	1.50
18" dia. (12" pitch)	1.25	1.75

APPROVED GAS MODEL WHEELS

Ohlsson Wheels		M & M Wheels	
2½" dia.	$1.25 Pr. P.P.	2⅜" dia.	$ .90 Pr. P.P.
3½" dia.	1.50 Pr. P.P.	3¼" dia.	1.50 Pr. P.P.
4½" dia.	1.75 Pr. P.P.	3½" dia.	2.75 Pr. P.P.
		4½" dia.	2.75 Pr. P.P.

NATION-WIDE DISTRIBUTORS FOR

BRIGHT-STAR BATTERIES

These batteries have been tested and found to give at least 20% longer service yet are the same price as ordinary flashlight batteries. Available in three sizes.

Standard Size, 10c each
Medium Size 10c each
Penlite Size 5c each

(Add 15c Postage on mail orders, regardless of quantity ordered.)

ASK YOUR DEALER FOR "BRIGHT-STARS"

BERKELEY MODEL SUPPLIES

"First in Gas Models"

230 Steuben St. Dept. U-41 Brooklyn, N. Y.

FLY THE *AIR CHIEF*
A RECORD BREAKER

$6.00
Complete without Motor

61" wingspan, length 39"
weight 2¼ lbs. without motor

Equip with any standard miniature engine. Kit includes—Wood cut to size, Pneumatic Air Wheels, Formed Shock Absorbing Landing Gear, Die cut Ribs, all needed Parts. Complete without motor **$6.00.**

U. S. S. HARTFORD

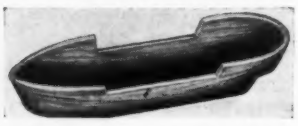
Historic Beautiful Complete
At last the flagship of Admiral Farragut is yours to build. The kit for this 20" model contains: Balsa hull block, 3 sheets printed wood, cement, lacquer, shellac, piano wire, cast metal anchor, cast metal boats, steering wheel, funnel tubing, dowels, sandpaper, rigging thread, beads, and full size plan. **$1.00** Complete

CUTTY SARK

Carved wood hull printed balsa decks, Cast metal: lifeboats, anchor, bitts, steering wheel, chains. Masts, spars, rigging cement, colored lacquer, full size plans, instructions.
COMPLETE..... **$2.50**

Complete Catalog 10c

DEALERS



SHIP MODELS with MOULDED HULLS
TO RETAIL AT 10c AND 25c

Your name imprinted free on IDEAL'S famous TRU-CUT KNIFE—the only all-purpose tool for model building. It is held and operated the same as a pen. It is especially designed for cutting balsa wood, stencils, paper patterns, and other objects requiring accuracy of detail. At last this greatly-in-demand item may be purchased with YOUR NAME IMPRINTED. Retail 10c each. Write for full particulars.

IDEAL AEROPLANE & SUPPLY CO., Inc.
20-24 West 19th Street, New York
Pacific Coast Branch
Model Boat and Aircraft Company
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South Africa Distributor
70 Von Brandis,
Johannesburg, S. A.

CONVERSION TABLE

Degrees to Radians

Degrees	Radians	Degrees	Radians
0	0.0000	140	2.4435
10	0.1745	160	2.7925
20	0.3491	180	3.1416
30	0.5236	200	3.4907
40	0.6981	220	3.8397
50	0.8727	240	4.1888
60	0.0472	260	4.5379
70	1.2217	280	4.8869
80	1.3963	300	5.2360
90	1.5708	320	5.5851
100	1.7453	340	5.9341
120	2.0944	360	6.2832

See Fig. 3 for a typical example and application of the use of measuring angular velocity of an airplane engine crank-shaft bearing, and its influence upon the piston speed per second.

Linear: Pertaining to a line or lines in a straight direction.

Rectilinear: Moving in or forming a straight line.

Curvilinear: Moving in or forming a curved line.

Angular velocity: The rate at which an object rotates.

Build and Fly the 1919 Nieuport

(Continued from page 19)

Cut the required landing gear struts to shape from 1/8" x 1/16" hard balsa and assemble the landing gear on the plane using short lengths of piano wire and plenty of cement. Be sure the auxiliary wing and the wheels are true and square with the fuselage of the plane. Mount the auxiliary wing at a negative angle of minus two or minus three degrees. Use any standard wheels with a diameter of 1 1/2".

Wings

Cover plate 3 with a transparent sheet of wax paper, join plate 4, and construct the left wing panel. Cut the ribs from 1/32" sheet balsa and the spars from 1/16" square hard balsa. Cut the leading edge from 1/8" square hard balsa and the trailing edge from 1/16" x 3/16" and 1/16" x 1/8" hard balsa. Pin the layout to a flat board and secure the parts in place with pins until the cement is thoroughly dry. Take care to avoid breakage when bending the wing tips. Do not heat the bamboo but hold it in place on the layout with pins until the cement is dry. Slant No. 1 rib in order to secure the proper dihedral angle.

To construct the right half of the wing, trace the layout of the wing on transparent wax paper, turn the paper over, and construct the right half on the resultant layout. Cement two pieces of cork or soft balsa between No. 6 and No. 7 ribs on each wing to secure the struts. Cover the space between the first and second ribs with 1/64" sheet balsa, cutting out a semi-circular space for the wing panel windows to be covered with cellophane or thin celluloid. Cement the dress snaps in their correct places on the No. 1 ribs.

Cover each side of each wing with a separate piece of Jap tissue, spray lightly with water and fasten flatly to a board with pins or small weights. Insert a 1/8" square piece of balsa under the tip leading edge of the left wing panel before fastening down to dry. The increase in the angle of incidence toward the wing tip will compensate for the twisting and turning effect of the prop torque. When the surfaces are dry give the entire wing a light coat of dope. Be sure the dress snaps on the wing and center section are adjusted so the wing fastens securely and snugly to the fuselage.

Empennage

Place a piece of transparent wax paper over the drawings of the rudder and stabilizer and construct each from 1/16" square balsa for the ribs and 1/16" x 1/8" balsa for the outlines. The curved outline is built up from sections and cut from 1/16" sheet balsa so that the grain of the wood will follow the outline of the curve. Pin the pieces flat to the board while constructing, until the cement is dry. Cover each side of the fin and stabilizer and spray the surfaces with water. Pin flat to the board and let dry, after which each surface can be given a light coat of clear dope. Fasten the stabilizer to the fuselage first, being sure that it is at an angle of minus two degrees to the line of thrust. Cement the rudder firmly in place.

Cowling and Motor Stick

The cowling can either be built up from 1/4" balsa "lifts" or turned and hollowed from a solid block of balsa 2 7/8" square x 1 1/4". After carving and sanding, a 1/32" bulkhead is cemented to the rear of the cowling.

The 1/4" x 1/8" x 11 3/8" motor stick is made from hard balsa and is slightly larger where it is fastened to the cowling. Cement the motor stick in place on the cowling and add the rear rubber hook. Carve the right handed flying prop from a balsa block 5/8" x 1" x 7". Insert 1/32" aluminum tubing bearings in the cowling and propellor. Insert the prop shaft from the rear of the cowling, add washers and a bead. Place the prop on the shaft, add free-wheeling detail and bend the end of the shaft at right angles. Cement the corresponding halves of the three dress snaps to the cowling bulkhead and to the fuselage bulkhead No. 1. After the dress snaps have been added, the cowling and motor stick may be removed as a unit from the model, for winding or interchanging flying and scale props. Six or eight strands of 1/8" flat rubber are sufficient for flight. If desired, paint the entire model silver with black details, numerals, and red, white and blue French insignia. For scale representation, carve the headrest and fairing from solid balsa.

Adjusting and Flying

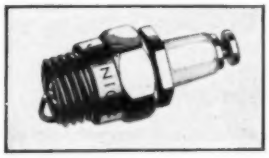
Seal one end of a one piece of soda straw and glue it in place on the inside bottom, of the balsa motor cowling. With the rubber and prop in place, glide the model several times over soft grass. If the model stalls, insert buckshot or BB shot in the straw until the stalling tendency is corrected. If the model dives sharply, remove the shot or carve away the inside of the cowling until the model glides correctly. When near perfect glides are obtained, wind the prop about 100 turns and launch by hand. Correct any further erratic tendencies, give the prop about 500 turns and launch for a fast climbing, thoroughly enjoyable flight.

WORLD'S RECORD
30-second shut-off
Houston, Texas
TRENTON PETROLEERS MEET, Mercer Airport
Harold Johnson won R.J. Hughes Trophy.. setting
new official N.A.A. Record of 6 Minutes 25 3/10 seconds
EASTERN STATES MEET
1st - 2nd - 3rd - 4th and 5th
places to Brown Model D
11th. ANNUAL NAT'L. CHAMPIONSHIP
MODEL AIRPLANE MEET, Detroit
All major events won by Brown Motors
SOUTHERN CALIFORNIA GAS MODEL
MEET... 1st - 5th - 6th and 8th places
NEW YORK GAS MEET
1st and 2nd places
6th. ANNUAL MISSISSIPPI VALLEY MEET
Winner of Performance event

Count these contest records

. . . and see why the Brown Motor is the *only* one for your model!

Noted above are just a few of the contest records recently made by Brown Junior Motors. Brown has so many victories to its credit that you can't fail to place it No. 1 on your wanted list. And—you can now buy this famous motor for *less* than the price of an ordinary motor kit! Get this incomparable power-plant for your model. Get set for your own contest records — and for more thrills than you've ever known before! Junior Motors authorized dealers, equipped to give you expert service and advice, are located in every section of the country.



MAKE YOUR MOTOR RUN BETTER WITH THIS NEW SPARK PLUG

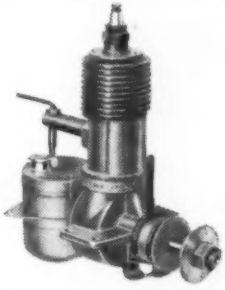
Engineered specially for model motors. High-tension dielectric heat resisting core. Special thermo-controlled center electrode. Concentrated, powerful spark for easy starting. Leak-proof for perfect performance and long life. Make your model motor run better. Change to the J-M Spark Plug today. 65c each.

Other Brown Junior Motors include these outstanding performers:

MODEL B: Special steel cylinder and steel piston retain compression and power. Chrome-molybdenum crank-shaft, practically shock-proof. $21.50 complete. MODEL C: Light weight combined with durability at the medium price of $17.00 complete. MODEL M (MARINE): With the speed and stamina characteristic of Brown motors for model planes. $15.00 complete.

BROWN JR MOTOR

JUNIOR MOTORS CORPORATION
2545 N. BROAD STREET, PHILADELPHIA, PA.



BROWN JUNIOR MOTOR

MODEL D

complete with coil and condenser — ready to fly — only

$10

MODEL D SPECIFICATIONS

Bore, 7/8". Stroke, 1". Weight (bare) 6 1/2 oz. 1/8 h.p. R.P.M. 1200 to 10,000. Height 4 3/4" (including spark plug). "Z" metal counterbalanced crank-shaft. Connecting rod of forged aluminum alloy.

Block-tested before shipping and guaranteed against defective workmanship or materials.

Brown *JUNIOR MOTORS*

Bud Warren makes another friend.

BUD WARREN Says:

THIS GAS MOTOR BUSINESS is lots of fun when you come across fellows like Jim.

I am pulling a pretty batch of gas model flying at the airport when Jim comes up looking sad.

"I guess I am a brute for punishment." Jim says. "Every time I look up your gas jobs are going up like an empty elevator but I haven't had a good flight for weeks.

"Well, I am no magician," I tell him, "This job I am flying is plenty old and still flies like a charm.

I fire up my Tom Thumb engine and make another flight to prove my point while Jim explains.

"My ship's as well designed and built as any I have seen; it's the motor that keeps me in a sweat."

I see he's discouraged. He's got a good job all right and I tell him so.

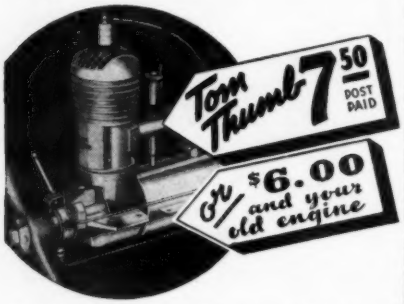
"The main thing," I say, "if you're going to get that job off the ground is a *real* motor and that is why I am selling the Tom Thumb engine."

Then I tell him how the Tom Thumb is only 4¼" high with a ⅞" bore and 13/16" stroke and *delivers full 1/5 H.P. Jim is amazed when I assure* him the Tom Thumb blocktested complete with fuel tank, coil, condenser and Champion spark plug delivered to his house postpaid is only $7.50.

"And what is more," I continue, you can send in your old engine that won't run, in fact any engine and receive a Tom Thumb complete ready to run for only $6.00.

"That's a neat proposition," Jim comments with enthusiasm, yanks the old motor from his ship and gives it to me right on the airport.

Jim boosts my money saving motor deals to the sky. No Wonder! That's where his new Tom Thumb puts his gas job—in the sky where it belongs.



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412 Brett St. Inglewood, Calif.

☐ Rush me one New Tom Thumb Engine. I enclose $7.50.

☐ Rush me one new Tom Thumb Engine. I enclose $6.00 and my old engine (any make) including all parts regardless of condition.

I intend to run my Tom Thumb—
☐ Upright ☐ Inverted

Street.....

Name.....

City.....*State*.....

Designing Your Gas Model "Prop"

(Continued from page 17)

angle of incidence. It is not always desirable to set the wing at this incidence value (3° with the line of thrust). Possibly 2.5° or some other setting may be required. If this is so, the proper procedure is to determine first the speed of the model by means of the graph, and then find the new speed at the new angle of incidence by inserting the graph speed value and the new angle of incidence in the following formula:

$$V_2 = V_1 \sqrt{\frac{6}{3+I_N}}.$$

In the formula, V_2=the new speed at any angle of incidence other than three degrees. For instance a value of 2.5 degrees in place of I_N which represents the new angle of incidence; V_1=the speed indicated at the top of the graph, or the old speed.

As an example let us suppose the graph shows that your model will have a speed of twenty miles per hour at three degrees angle of incidence, but the wing of your plane is to be set at two and a half degrees angle of incidence. The speed at this incidence value may be determined by inserting the numerical values in the formula in place of their respective symbols and solving the equation, as:

$$V_2 = V_1 \sqrt{\frac{6}{3+I_N}} = 20 \sqrt{\frac{6}{5.5}}$$

$$= 20 \sqrt{1.09} = 20\ (1.045)$$

$$= 20.9 \text{ miles per hour.}$$

The pitch of the propeller for this speed now may be determined by reading its value in the horizontal pitch column above the speed of 20.9 miles per hour. In this case the propeller should have a pitch of 8.36 inches.

The following table gives the plane speed at various angles of incidence, in terms of the speeds given in the table:

Angle of Incidence	Speed of Plane
1°	V_1(1.225)
1.5°	V_1(1.153)
2°	V_1(1.095)
2.5°	V_1(1.045)
3°	V_1
3.5°	V_1(0.962)
4°	V_1(0.926)
4.5°	V_1(0.895)
5°	V_1(0.867)
6°	V_1(0.817)
V_1=Speed Value Shown on the Graph	

Incidentally, the gliding angle of the average gas model is approximately six degrees, so the gliding speed as well as the minimum level flight speed may be determined from the table values.

Determining the Final Characteristics of the Propellers

The final step of designing your propeller now has been reached. It is to determine the final blade width and diameter of the propeller, the pitch required and the power available already having been established. It is advantageous to use a propeller with as large a diameter as possible. Of course if the diameter is excessively large the blade width will have to be excessively small. The best proportion of diameter-to-blade width is about ten-to-one. You will recall that this has been discussed in previous articles. The best diameter for a 1/5 horsepower engine, for instance, is fifteen inches. If it is necessary, in such a case, to make the blade width a little less than 1/10 the diameter, in order that the diameter be made fifteen inches; it is best to do so provided the width is not less than 1/12 the diameter.

In order to illustrate this final procedure of propeller design, suppose we assume that the required propeller pitch is eight inches and that the plane is to be powered with a 1/5 horsepower engine. The correct diameter and blade width, under these conditions, may be found in the table that appears on page 37 of the September issue of MODEL AIRPLANE NEWS. At the left of the table the horsepowers are listed. Pick out the horizontal column in which the value of 1/5 hp. is located. Follow this column to the right until you come to the values of diameter (D) and blade width (W_B) under the pitch value of eight inches. These are the correct values of diameter and blade width. They are: diameter=15 inches; blade width=1.5 inches.

If the required pitch is ten inches instead of eight inches, the table shows that a diameter of 14.2 inches and a blade width of 1.42 inches is required. If a fifteen inch diameter is desired under these conditions it will be necessary to determine the required blade width from the table at the upper right hand corner of the graph that appears on page 27 of the August issue of this magazine. In order to find the correct value in the table, find the point on the graph at which the vertical fifteen inch diameter line intersects the horizontal 1/5 horsepower line. Then determine the location of this point relative to the *dotted* curves. This point lies directly on curve No. 4. Follow this curve up to the table. Under the ten inch pitch column a blade width of 1.2 inches is specified. Thus for a propeller of ten inch pitch driven by a 1/5 horsepower motor, a blade width of 1.2 inches is required when the diameter is fifteen inches.

If a diameter of sixteen inches should be desired for any reason, a blade width of a little less than 1.0 inch would be required, according to the table. Actually it would be about 15/16 inches.

Determining the Diameter and Blade Width by Formula

The diameter and blade width may be determined by means of a simple formula, if such a method of procedure is preferred to the graph-table method. The formula used in such a case is as follows:

$$\text{H.P.} = (0.000005)\,PW_BD^3.$$

In the formula; H.P.=the horsepower

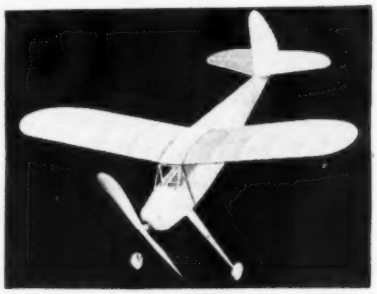
MODELCRAFT WILL AWARD $100.00

TO THE WINNER OF THE 1939 NATIONALS
PROVIDING HE IS FLYING A *MODELCRAFT* GAS JOB

Be a winner! Buy a Modelcraft Kit and get in the Champion class. Start right now—send for our FREE Catalog of latest Gas and Rubber Models and Supplies.

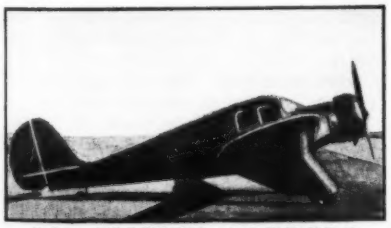
★ A Modelcraft gas job won the Dupont Trophy for first place at the 1937 Nationals.

NOTICE TO DEALERS
We will pay $25.00 to the dealer who sells the winning Modelcraft Gas Kit in the 1939 Nationals.



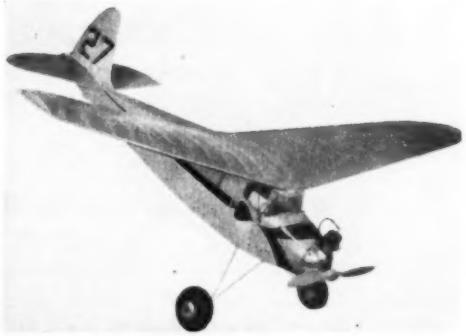
30 in. PACIFIC ACE

A practical and durable commercial model. Easily constructed from well drawn and detailed plans. **Kit contains** an ample supply of first grade wood and high quality cement. Comparable with and out-flies most dollar kits. **Add 10c for Postage.** **25c**



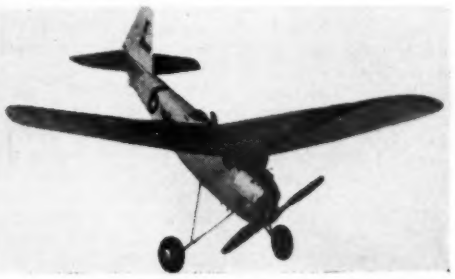
40" FLYING MODELS

AERONCA Low wing (pictured) and REARWIN Speedster
Kit 50c plus 10c postage



1939 PACIFIC ACE GAS MODEL

New throughout, with latest improvements in design and construction. Flying weight 3 lbs., 4 oz. Wing span 66 in., tapered from 12 to 5½ in. **Kit contains** formed landing gear, formed aluminum (Orwick) cowl, die-cut ribs, inflatable air wheels, hook-up wire, cement, dope, complete..... **$8.50**
Dry kit same as above without cement, dope, silk or wheels **$4.75**

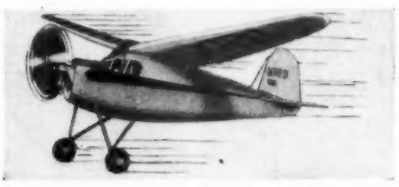


1938 SCOUT GAS MODEL

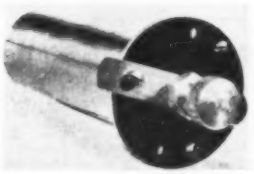
A Ship for POWERFUL flying, with a 60" tapered Clark Y wing. **Kit contains** formed landing gear, ready-cut ribs, formed face plate and cowl, switch, hook up wire, cement, dope, silk, full sized plans and Voit air wheels. Only..... **$7.25**
Prepaid in U.S.A.

Special money saving deal: Kit, Timer and Ohlsson engine..... **$25.00** **SAVE $2.25**
Same kit with bamboo paper and rubber Donut wheels **$4.85**
Dry Kit: No cement, dope, covering or wheels **$3.95**

THE FALCON



POWER WITH BRAT, TROJAN, HUSKY, ELF OR CHUNN ENGINE. Boys, here is the plane for you. Easy to build, and flies smooth as a Gull. 38" tapered wing. **Kit complete** with cement, dope, wheels, covering, printed ribs, formers, etc. **$1.50**
Deluxe kit with Traxler air wheels and silk covering **$2.95**



NEW FLIGHT TIMER

Adjustable from 1 second to 1 hour. Weight ⅝ oz. Accurate, reliable. Complete to drilled mounting holes. Ready to attach wires and install in ship. **The first dependable timer made just for models....** **$1.25**

BROWN JR. MOTOR

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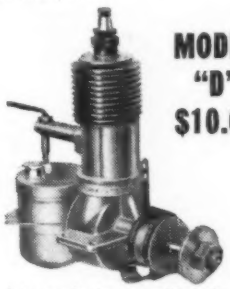

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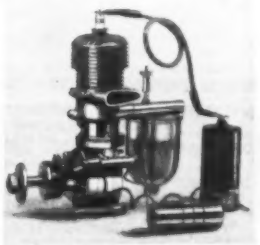

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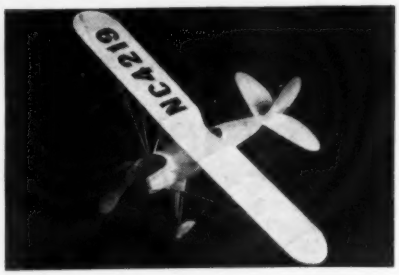

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available; P=the propeller pitch; W_B= the blade width; and D=the propeller diameter. The value of the numerical constant is for a motor velocity of 4000 revolutions per minute. When applying the formula method you proceed in the following manner:

Let us assume that a 1/5 horsepower motor is to be used; the required pitch is eight inches and the blade width is to be 1/10 the diameter. Insert these values in the formula. Then we have:

$$0.2 = (0.000005)\ 8\ \left(\frac{D}{10}\right)D^3$$

Now solving for (D):

$$D^4 = \frac{(0.2)(10)}{0.00004} = \frac{2}{0.00004}.$$

Then;— $$D = \sqrt{\sqrt{\frac{2}{0.00004}}} = \sqrt{\sqrt{50,000}}$$

$$= \sqrt{224} = 15 \text{ inches.}$$

Thus the diameter is fifteen inches. The blade width equals 1/10 the diameter, so dividing the diameter by ten ye have: 15/10=1.5 inches, the blade width.

If you wish your propeller to have any specific blade width other than fifteen inches, all that is required is to insert in the formula the numerical value of the diameter desired, and solve for the corresponding blade width.

Some may find this formula method much simpler than the graph method; however a study of the graph method will give the designer a clear conception of reasons and principles involved in the design of the propeller. This ultimately will be of great benefit and will enable him to understand rather than merely have the ability to work out the problem.

If it is desired to use the cubic inch displacement of the engine rather than the horsepower rating, the formula will be as follows:

$$C_u = (0.000015)\ PW_BD^3.$$

In this case the cubic inch displacement of the engine is inserted in place of (C_u).

All the calculations so far have been based on the assumption that the revolutions per minute of the engine is 4000, as this is the normal running speed of most engines. However, some develop full power at other velocities, so next month it will be shown how to determine the correct propeller characteristics for any normal engine speed.

The Indoor "Stick" Canadian Record Holder

(Continued from page 28)

NEWS experimenters with the suggestion they enter a specially designed low-ceiling model in their next low-ceiling contest.

A glance at the plans and the reader sees the banana-shaped tail which prevents the wing from washing out should the model hit an obstacle and go into a power dive. Chicago experimenters are generally credited with originating this odd-shaped yet highly efficient stabilizer. John P. Glass is also known to have carried on early work along these lines.

Apparent also is the tungsten bracing on the wing and motor stick. The bracing is comparatively simple; by following the bracing suggestions, the builder can produce a ship which will have a much higher strength-weight ratio than a similar size unbraced model.

Incidentally, it may be of interest to know the author had the dubious honor of appearing with the first tungsten wire braced model in a national fray.

This was at Akron in 1934, and cries of "Why don't you brush the cobwebs off your ship?" and "Wilbur's building birdcages" greeted the appearance of the original plane.

Tungsten bracing has outlived the laughs and today it is accepted wherever indoor activity flourishes as an ideal lightweight easily-applied low-drag bracing for indoor wings, motor sticks and fuselages.

Thin aluminum clips are used to hold the wing to the motor stick and are an innovation which originated in Boston. Hewitt Phillips first appeared with this type of clip which will not cut into the stick.

Among the factors which contribute toward high performance are the efficient wing and the light wing loading.

The wing loading without rubber is approximately .00047 ounces for every square inch of wing area. The power-weight ratio is approximately 45%. The bracing arrangements and the exacting control of weight distribution account for this. The table of weights of each model in the series which preceded this ship were almost the same. Since indoor balsa wood varies considerably in weight, it is almost impossible to construct a model from the accompanying plans, using the same size wood as specified, which would have the same weight as the original craft. Instead, it is suggested that those who build the model, build by weight even if this necessitates slight deviations in size of spars, stick blank or rib stock.

The wing with its aspect ratio of 10-to-1

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and its double ellipse shape is the type universally accepted as being the most efficient. Microfilm fairing has been used on the spars. This was developed by Michael Lichtstein of Philadelphia and actual gliding tests by the author have proven the worth of such fairing.

Wallace McBride developed the B-7 airfoil section which was selected for this series of models after long research carried on in conjunction with one of the early low-speed wind tunnels. The B-7 section is in widespread use at the present time.

Should this design prove so successful that a builder might want to try it out at the Nationals, it is quite possible. A change in rubber power, a larger prop and a different adjusting technique will aid in gaining greater duration for high-ceiling flying.

This chart gives the changes required for low-ceiling and high-ceiling flying:

Effective Ceiling	Rubber Size	Loop Length	Duration in Minutes	Prop.	Turns
20-ft.	1/16	20"	6	As shown in drawing.	900
30-ft.	5/64	22"	7		1000
40-ft.	5/64	21"	11		1300
50-ft.	5/64	20"	13		1600
60-ft.	5/64	20"	14		1700
70-ft.	3/32	24"	16	High-ceiling: 10"x7"x1 11/16 in front behind hub.	1700
80-ft.	3/32	22"	18		1900
90-ft.	3/32	22"	20		2100
100-ft.	3/32	22"	22		2300

Construction

The drawing gives the required wood sizes for all parts of the model. In constructing the wing, first plot the entire wing shape on a piece of thick cardboard.

This piece of cardboard will serve as a building jig. After the ellipse has been plotted and the rib positions drawn, half-inch notches are cut in the cardboard at both ends of each rib. This is illustrated in the supplementary drawing, Fig. 1.

After preparing the cardboard jig, thumb-tack it down to a soft board base. The wing spars are pinned in place around the jig after being moistened. The spars are sanded down from 1/16-inch square strips of balsa so that their thickest portions are halfway between the tip and wing center.

Make a full size wing rib template and cut ribs from a quarter-grained sheet of 1/32-inch medium hard balsa. Cement ribs to spars in jig, checking alignment of ribs.

Add wing tips which are bent around a soldering iron or heated funnel. Break spars to obtain dihedral, cement, and then cover with "red-and-green" microfilm. Both the leading and trailing spars are now ready for the microfilm fairing. To apply this first make a narrow framework as illustrated in Fig. 2. This framework is slightly longer than the section to be faired. The frame is covered with microfilm. Then the lower edge of the wing spar is moistened and that portion of the film which is a half-inch away from the spar. The covered framework is

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Baby Cyclone	6.00	Husky	8.00
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Pt. Berryloid Dope	.50
Condensers (best)	.15
Booster Plugs (set)	.30
Silk, Sq. Yd.	.45
Bamboo Paper, 24x36	.05

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3/16x3/16	8 for .25	1/8x2	2 for .10
3/16x1/2	2 for .10	3/16x2	2 for .10
3/16x1	2 for .19	1/4x2	2 for .14
1/4x1/4	6 for .25	3/16x2	2 for .14
1/4x1/2	4 for .25	1/4x2	2 for .18
1/4x1	3 for .25	1/2x2	2 for .35
3/8x3/8	3 for .25		
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1/2x1	1 for .15	Double the 2" price for 3" widths.	
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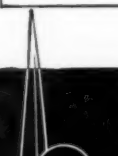

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placed directly on the lower edge of the spar with the frame extending beyond the spar and in contact with the bottom of the microfilm wing covering. With a piece of balsa, the film on the frame is pushed against the film of the wing until the two adhere. The framework is then swung up vertically and the fairing film along the outside of the wing spar is carefully burned off. Then the remainder of the fairing patch is loosened from its frame.

Result: Faired wing spars to decrease drag.

Cement wing struts to leading and trailing edges, offsetting each 3/8-inch to right of center rib to compensate for torque. The forward strut is 1/4-inch longer than the rear strut to provide the necessary incidence. The short pointed vertical continuation of the forward strut is now cemented to the leading edge. This will act as a brace for the tungsten applied to the top of the wing.

From 1/32-inch sheet aluminum cut 1/32-inch wide strips, bend around 1/4-inch rod as indicated in the drawing and cement one to bottom of each strut.

When bracing the wing and stick with tungsten wire it is a wise precaution to use a large sheet of white paper as a background upon which to work. This will enable the builder to see the wire at all times.

The bracing should be taut enough to prevent the wing dihedral from increasing in flight. In applying the wire, work inwards, first cementing the bracing to the spars at the designated points on the bottom of the leading and trailing edges of both wings.

The anti-washout bracing is cemented to the top of the leading edge spar on both wings, as shown. After cement hardens thoroughly the four wires attached to the leading edge are glued to the front vertical spars. Then the two wires attached to the bottom of the trailing edges are glued to the front vertical spar as illustrated.

A word of caution: When cementing the tungsten wire bracing to the wing spars make certain that the wing is not pulled out of alignment.

The banana-shaped anti-dive stabilizer is constructed with the aid of a cardboard building jig in the same manner as the wing. The stab's leading edge is sanded slightly smaller than the trailing edge. This insures automatic washout.

Next build the rudder using a third working jig. Cover stabilizer and rudder, then glue together with the rudder offset 1/4-inch so the model will circle with torque.

The motor stick is made in the conventional manner, with the addition of bracing posts. These are set into each end of the stick against a 1/32-inch sheet balsa rectangular strengthening piece which has been inserted at both ends of the motor stick. When applying the bracing and tightening the wires the builder must not warp the stick. Metal fittings are added and then the bottom is added, set at zero angle. The tail surfaces are also cemented to the boom at a zero angle.

The only construction step left before completing the model and winning top place is carving an efficient propeller.

Block dimensions are given. In marking out the block include the extra portion as indicated. This small but important change from the conventional layout adds considerably to the prop's performance.

Don't rush carving operations. Camber of each blade must be uniform; thickness of each blade tapers from 3/64-inch at the hub to paper-like thinness at the tips. Carefully balance the prop during the sanding operations. Fine jeweler's paper is used to produce a hard, polished surface.

Now the model is assembled. When doing this the builder should remember to place a well-oiled washer on the prop shaft. And don't get snagged in the tungsten, or you'll be late for dinner!

Adjusting

Prewind the rubber motor several times before attempting test flights. 200 turns are then put in the motor; this amount of power should fly the craft in a circle without its climbing or descending. Watch for any tendency to stall, skid or make too wide a circle.

Once adjusted, the motor is fully wound and half the number of turns are "let out" before the model is launched. This is a precautionary measure to keep the model from breaking through the roof on its first flight.

Using the first flight as a comparison, fewer turns can be "let off" on subsequent flights until the model is finally obtaining its maximum duration without becoming "hung up."

Table of Weights

WING:	4 spars	.01	
	Ribs	.003	
	Tips	.001	
	Cement	.001	
	Clips	.001	
	Bracing and mounts	.002	
	'Film	.003	
			.021
STICK:	Blank	.008	
	Cement	.001	
	Bearing and hook	.002	
	Bracing	.0015	
			.0125
TAIL:	Boom blank	.0015	
	Cement	.0008	
	Wood	.003	
	'Film	.001	
			.0063
PROP:	4.5 lbs. cu. ft. balsa	.013	
	Washer and hook	.001	
			.014
	Total		.0538

Frontiers of Aviation

(Continued from page 15)

future transports because of their size to gain sufficient accelleration soon enough on the take-off. So far the only practical solution to the problem appears to be the use of catapults or steep inclines at the beginning of runways. This means more work for the designer in order to incorporate strength into the structure to withstand the stresses from the catapults. Of course the catapults will not be required to give the plane full flying speed, as those on battleships do, but will help the airplane to get on its way and the ship may roll along the ground after leaving the catapult to gain more speed under its own power.

While on the topic of big airplanes here is another one of those Douglas proposals which may precede the 160,000 pound army bomber. This one, we hear, will have a 200 foot wingspread and a length of 120 feet with four of those 2,300 hp. Allison engines neatly imbedded in the wing. But enough of that talk. We could go on for years relating what the big companies are planning to build. Taking something that is now an actuality with all the bigness of the Douglas DC-4 and which has gone almost unnoticed by the aviation world, is a large navy seaplane of very modern design and construction. It is almost as clean in design as our Sikorsky or Consolidated navy boats or the Royal Air Forces "Sunderland" patrol bomber, yet it is much larger, spanning all of 132 feet! It is the Breguet 730 built in France with slotted camber-changing flaps. Four Gnome-Rhone 1,100 hp. engines pull the plane at a cruising speed of about 175 m.p.h. Wing loading is 30 pounds per square inch. The wing floats consist of solid panels, full cantilever, extending from the extremities of the center section to the water line. They say the Frenchmen get a range of almost 3,000 miles out of the ship. The Brequet is one big flyingboat with plenty of rudder area. It has two large rudders at the tail.

We hear that in England Short Brothers is working on another patrol bomber twice as large as the "Sunderland" . . . and if Short is building it, it will be worth seeing.

Following are some interesting notes on the new Curtiss double-ruddered, mid-wing, twin-engined transport that should be one of the "best sellers" of 1939. First here are the specifications:

Wing span—108 feet.
Overall length—76 feet
Overall height—18 feet 8 inches
Wing area—1353 sq. ft.
Weight empty—23,090 lb.
Useful load—12,910 lb.
Gross wt.—36,000 lb.
Maximum speed—(12,000 ft.)—237 m.p.h.
Cruising speed—200 m.p.h.
Cruising speed—210 m.p.h.
Landing speed—66 m.p.h.
Service ceiling 33,000 feet.
Single engine ceiling—14,800 feet.

The plane is a double-decker with baggage below and 30 passengers above. Loading and unloading operations therefore do not interfere with the comfort of the passengers. Pressurization of the cabin was done under the supervision of Prof. Younger, who gained much experience when associated with the design of the Army Lockheed stratosphere airplane. The engines are

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NOTE—We received $25 for the loan of our sample model to be photographed for advertising purposes by a large manufacturer of popular brand cigarettes.

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Wingspan 29½"

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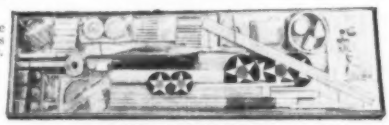
Vought Bomber.....	3.00	China Clipper.....	1.50

MODEL of the GRUMMAN S. F. 1

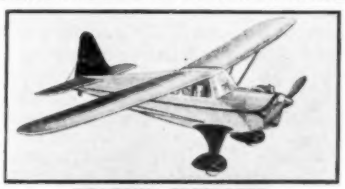


WING SPAN 21⅜ in.

A low wing—2 place—closed cockpit—military monoplane. The Kawasaki Fighter. This kit contains over 110 parts. Paper and silk are furnished for wings and fuselage—the odd wing section used in the original is faithfully carried out in the 16 ribs and fillets which are fully finished, shaped and notched. Tail surface assembly and tail ribs are shaped and numbered. Special type of pants used like the original. Propeller finished—all metal parts formed—front wheels and skid wheel completely sealed. Cement—rubber—insignias. Plans of full-size and instructions make the construction of this interesting type of model a pleasure to build. COMPLETE KIT.. **$2.50 P.P.**

THE GOEPPINGEN—1
(Dupont Soarer) 40" Wing Span
64 in. Wing Span **1/6 Original Size**

A GAS MODEL OF A REAL PLANE



REARWIN SPEEDSTER
Can be powered with Gasoline—AC:CO Gas, Compressed Air, or Rubber Motor.

Complete "Definitely with" Kit

Including Fully Finished Notched and Webbed Paulownia Wing Ribs
Colored Bamboo Covering Paper (no colored Dope needed)
Movable and Controllable Ailerons and Rudders
12" Paulownia Wood Propeller with Spinner and Nose Piece also a 13" Sakura Gas Propeller
3" Puncture Proof Cork-tired Aluminum Balloon Wheels 1½" Cork-tired Aluminum Skid Wheel
4 oz. Can Imperco Cement **4 oz. Can Clear Dope**

Finest Quality Hard, Medium and Soft Balsa. Brass and Copper Hardware, Aluminum Tubing, Round Bamboo, Cement and Stripping Brushes, Pants Cores and Sides fully cut. Hard Bass Wood for special parts, with two sheets of full-size plans (22" x 30" and 16" x 30" size) printed in eye-resting green ink on heavy paper with separate Instruction Sheets all drawn and redesigned by an aeronautical expert and war-time flyer.

This Complete Kit with Absolutely Everything Required to Build the "4-in-1" Model. $4.50 Postage and Packing 30c

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For that select group of model builders who are not happy unless they break records, we present six types of gears designed by an expert for endurance and distance flights. They are of aluminum construction, light enough for a 12" model, and strong enough for a six foot wing span.

Type A Single motor increaser (Ratio 1-1½) 50c each

Type B Twin motor increaser. For 2 motors Ratio 1-1½ 75c each.

Type C Single motor reducer Ratio 1½-1 50c each

Type D Twin motor reducer for 2 motors —1 Prop Ratio 1½-1 75c each.

Type E Coaxial—twin motor—for 2 props —1 right—1 left—eliminating torque—75c each

Type F Return type—for twin motor and 1 prop—for rear fuselage mounting 60c each.

Types A-C-E and F weigh .02 ounces—Types B and D weigh .0225 ounces.

For those who wish to build their own transmissions—we have 8 teeth (¼" diam.) & 12 teeth (⅜" diam.) (ALUMINUM GEARS mounted on 1/16" steel shafts at 20c each (postage 5c)

FREE With each $1 purchase—plans, instructions and material list for building the "WRONG WAY PLANE." Set it to fly West and it flies East or vice versa.

No C.O.D. shipments. All prices quoted herein are for the U.S.A. only. Add 10% for foreign shipments. **DEALERS!!** All "TRU-DETAIL" kits are boxed so that the entire contents can be seen. (See illustration.)

Send 10c for complete catalogue of Airplanes, Boats, Trains, Engines, Propellers, Charts and Diagrams.

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251 West 55th Street Dept. M New York City

If You Are Looking "for a Special Motor" the Husky is it
The Lightest Complete Ready to Run Gas Motor on the Market

The New "Auto Type Snap Spark Ignition" Starts the "HUSKY" Right Now—This new feature does away with the breaking of the stiff old style upper spring used on the Husky Jr. Also you don't have to dismantle the timer to clean and adjust the points, which can be done in a few seconds. We guarantee the "Husky" to give you 100% satisfaction.

The NEW "HUSKY" runs Equally as well Upright or Inverted and was Designed to Fly Models Weighing from 16 oz. up to 3½ lbs. The "HUSKY" will run Steadily at any Speed from 250 R.P.M. to 6000 R.P.M. using either a 11" or 12" Prop. The NEW "HUSKY" is BEAUTIFULLY FINISHED THROUGHOUT—It is BUILT to WITHSTAND any TEST it is put to—Each motor is THOROUGHLY TESTED, RUN IN and FULLY GUARANTEED to GIVE you Consistent Performance and LONG LIFE. ⅝" bore, ⅝" stroke. Wt. ready to run 6½ oz. Including two pencells for Current.

We are going to see to it that every HUSKY owner will be completely satisfied and a hundred per cent booster. You can't go wrong. ORDER YOUR HUSKY TODAY! IMMEDIATE DELIVERY.

Husky motor mounts, wt. ⅔ oz., per pr., postpaid 50c
Husky Non Brittle prop. 11" or 12" each, postpaid $1.00

Husky complete ready to run (less motor mounts, batteries and prop.) Post-paid $12.50

If your dealers do not sell HUSKIES order direct from

HUSKY MINIATURE MOTOR CO.

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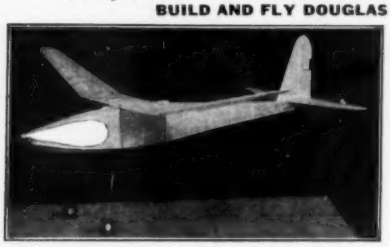
Dealers Write for Special HUSKY Discounts

The Douglas Model Aircraft Co. Now Owns One-half Interest in the Husky Miniature Motor Co.

BUILD AND FLY DOUGLAS UNIQUE CONTEST WINNERS

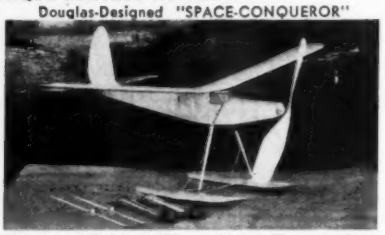


AERO GLIDE—Wingspan 41", length 30", wt. 3 oz. Kit contains all parts to assemble folding propeller—MAMCO BALL BEARING propeller shaft—M & M model wheels—special brown contest rubber motor—glue, dope, tissue, wing ribs and other parts printed on "AAA" sheet balsa—all strips cut to size—full size detail 3-view drawing. "Aero-Glide" Kit complete $2.25 Postpaid

Douglas-Designed Acrobat with Automatic Folding Prop. Span 26," Length 19". Kit Complete $1.25.

Send Money Orders or CASH only. When sending cash fasten coins to letter with adhesive tape. If located in Washington add State Tax.

Douglas-Designed "SPACE-CONQUEROR"



Wing span 36", length 27", wt. 2.8 oz. The new "Space Conqueror" Hydroplane, Landplane and Skiplane—all in one model—change from one to the other in two minutes. This model has an unofficial record of 19 min. 25 sec., 2500 ft. Altitude with M & M Model Wheels. And two to three minutes with pontoons and skis. It takes off just like a real plane, is very easy to build, and the flights it makes are really amazing.

Complete Kit with M & M Model Wheels, $1.75 P.P.

DOUGLAS MODEL AIRCRAFT CO.

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SEND FOR FREE CATALOG OF GAS AND RUBBER POWERED MODEL KITS AND SUPPLIES

Wright 14 cylinder double-row Cyclones of 1,600 hp. However the plane is stressed for 2000 hp. engines to be used at a later date.

The interior is very luxurious and has been designed by Raymond Loewy who has been in charge of design work at the aviation exhibit at the New York World's Fair. Much attention has been spent in simplifying the pilots' cabin to lessen fatigue. It is very spacious in its entirity with large windows in all directions. Other important features are flush riveting, the Curtiss slotted flap, the gradual change from one airfoil section to another as the wing tapers to the tip so as to reduce wing tip stalls at low speed. Then a new method is employed for holding the fabric on the tail surfaces by the use of metal clamps.

The N.A.C.A. 23000 wing section is employed in the major portion of the wing. This is considered the most efficient airfoil today, but for larger airplanes the tendency may be for symetrical airfoils as used on racers. This idea is already carried out on Boeing's XB-15. The new Curtiss creation is known as the Model 20 and should find a very large export market, besides being used on many of our domestic lines. It may also cramp the sales somewhat of Boeing's four-engined transports that are just in the offing. In spite of this twin-engined development we hear that Curtiss has not dropped their four-engined venture, and that may come at a later date with nose wheel and all.

Douglas however is not going to let Curtiss cop their twin-engined airplane business without some resistance . . . and what resistance it will be! On the fire right now at Douglas' is an airplane taking shape that will certainly be different from anything Douglas has put out as yet. This cancels any previous reports on the DC-5. This new Douglas which we hear will be known as the DC-5, will be high-winged so that the passengers may actually see the ground without having to spread their faces all over the window panes. The airplanes will be just the thing for TWA's scenic route over the Grand Canyon and Boulder Dam. Having a high wing the fuselage will set low to the ground and will make for easy entrance and exit. Up forward will be a nose wheel.

But the big feature of this new airplane will be safety, so we hear. It will not be a super-speed plane but will have a low-wing loading and a resulting relatively low speed. Watch for more details of this new Douglas challenge for twin-engined supremacy.

Last month the B.A.C. went on an A.T.C. spree and delivered that coveted certificate to many new ships that have long been under test. Among the more important ones were the Harlow PJC-1, the Aeroneer, the Bennett BTC-1, and we also hear rumor to the effect that Fairchild's Bakelite airplane also received one which really makes history.. Here are the specifications of the new Bennett:

Wing span—48 ft. 2 in.
Overall length—30 ft. 6 in.
Overall height—5 ft. 5 in.
Wing area—302 sq. ft.
Wing loading—22.8 lb./sq. ft.
Power loading—11.5 lb./hp.
Gross weight—6908 lb.
Top speed—206 m.p.h.
Cruising speed—196 m.p.h.
Landing speed—54 m.p.h.
Service ceiling—22,500 feet.
Cruising range—1176 miles.

Don Luscombe's new 50 hp. high wing monoplane is another to be granted an Approved Type Certificate.

From Maryland comes the news that Glenn L. Martin is working on an attack-bomber for a future competition, and it looks like Curtiss-Wright may have an army observation plane in store for us.

The army recently called for bids for radio-controlled airplanes which makes new history. They have already ordered three expirimental gas models from Reginald Denny for radio control work, but these new bids will be for the real airplane. Perhaps something in the category of the Aeronca or Piper Cub.

Next month watch for all the facts on the National Air Races and the ships that competed.

How to Build a Model of the Spencer-Larsen Sport Amphibian

Following is a list of the parts needed for building a model of this unique airplane: Three wheels, small cans of white and black dope, tube of model cement and sufficient balsa wood which may be purchased from any model supply company advertising in this magazine, or at the nearest department store or model shop. Get dimensions from plans. If desired, for a very small sum, the plans may be photostated to any size you wish. The material alone for building a model of this airplane should amount to well under $1.00.

The plans may be squared off, affording easier measuring if desired. Each square will equal one square foot. In laying out the various parts on the wood be sure that the wood runs lengthwise.

To get the most difficult part of the model built first let us start with the hull. Draw the top view and cut to shape with jig saw and sharp chisel. Sandpaper down the sides with coarse sandpaper and then draw the side view in correct position. Sandpaper once more and then finish the hull with a razor blade as shown by the cross-sections

Fall Specials at Wholesale

FREE 35c worth of supplies (your choice) with every order for $2.50 to $5.00. $1.00 worth of supplies (your choice) with every order for $5 or over.

For 36" Lengths in all wood just double 18" length Price

18" Balsa per	200
1/32x1/16	9c
1/16x1/16	9c
1/16x⅛	16c
1/16x3/16	22c
1/16x¼	26c
3/32x3/32	22c
⅛x⅛	25c
⅛x3/16	48c
⅛x¼	50c
¼x¼	80c
1x1 ..... 2 for	6c
2x2 ..... 2 for	23c
1x2 ..... 2 for	13c
2x3 ..... 2 for	32c
1/32x2..20 for	14c
1/16x2..20 for	17c
3/32x2..20 for	20c
⅛x2..... 20 for	22c
⅛x2..... 20 for	40c

COL'RED DOPE
All Colors
1 oz. bot. dz. 50c
2 oz. bot. dz. 75c

WASHERS
⅛ or ¼, 100 5c

Quill Brushes
doz. 7c gr..... .70

Shafts or Rear Hooks ..... doz. 6c

SHEET CELL.
6 x 8 doz..... .65

LG. INSIGNIA SHEETS
doz. 36, 100 $1.65

CLEAR DOPE
1 oz..... doz. 38c
2 oz..... doz. 60c
1 pt. 35c; 1 qt. 65c
1 gal. each $1.48

BUSHINGS
1/16 I.D., 100 13c

CLEARCEMENT
1 oz. bot. dz. 40c
2 oz. bot. dz. 65c
1 pt. 40c 1 qt. 60c
1 gal..... 1.75
5 gal..... 8.50

Jap Tissue
White, doz... 12c
Colored, doz. 14c
Silver, doz..... 21c

BEST BAMBOO	
1/16x¼x15 dz.	8c
1/16 sq. x12 gr.	10c

MACHINE CUT PROPS. per doz.

5"	20c	6"	21c
7"	30c	8"	35c
10"	45c	12"	60c

WHEELS, doz.

Birch	Bal.	Cel
½"	.85	.09
⅝"	.06	.11 .24
¾"	.08	.14 .23
1"	.10	.19 .35

THR BEARINGS
sm., dz. 6c, gr. .55
lg., dz. 7c, gr. .65

PARA RUBBER
225 ft. skeins.
.045 sq..... 30c
1/16 sq..... 33c
⅛ flat 40c

½" NOSE PLUGS
1 doz. 5c 100 33c

Orders Shipped Express Charges Collect. On C.O.D. orders, send 25% with order, balance on delivery. To save C.O.D. charges, send payment with order.

DIAMOND MODEL MFG. CO.

260 Troy Ave. Dept. M-11 Brooklyn, N. Y.

on the plans. Again go over the hull with coarse sandpaper and then fine sandpaper until the maximum in smoothness is obtained.

The next step is to make the wing. A right and left wing panel are to be made. Draw the plan view on stock and cut to shape. Then taper down the pieces with a flat chisel as shown by the front view, and conclude the process by shaping out the airfoil section. Sandpaper the surfaces and be very careful to get out all noticeable grooves.

All other parts may be made by using the same procedure—and you will find that the razor blade will be most helpful in this procedure. After all parts are made and thoroughly sanded begin the assembly.

It is very vital at this point to be most accurate. Prop the hull up in flying position on a flat surface and join the two wing panels to the sides with plenty of model cement. Put blocks under the wing tips to hold the correct dihedral. Then join the tail surfaces which include the rudder, fin, elevators and stabilizer.

While waiting for those joints to dry cut out the rear ends of the wing floats to insert the wheels. They may be joined with a straight pin as an axle through the thin sides of the floats and the hubs of the wheels. Then connect the floats to the wing with the necessary struts and cement. Connect the nose wheel in place and then the propeller shaft and propeller. Go over all joints with model cement once more and then sandpaper the entire model with fine sandpaper. Brush off all dust and apply the first coat of paint.

The model should be painted black and white as shown on the plans, and many coats will have to be applied before a smooth finish is obtained. It might be well to sandpaper the model after the first coat has dried before applying a second. After several carefully applied coats have been applied the model will be completed.

Getting the Most From Your Models

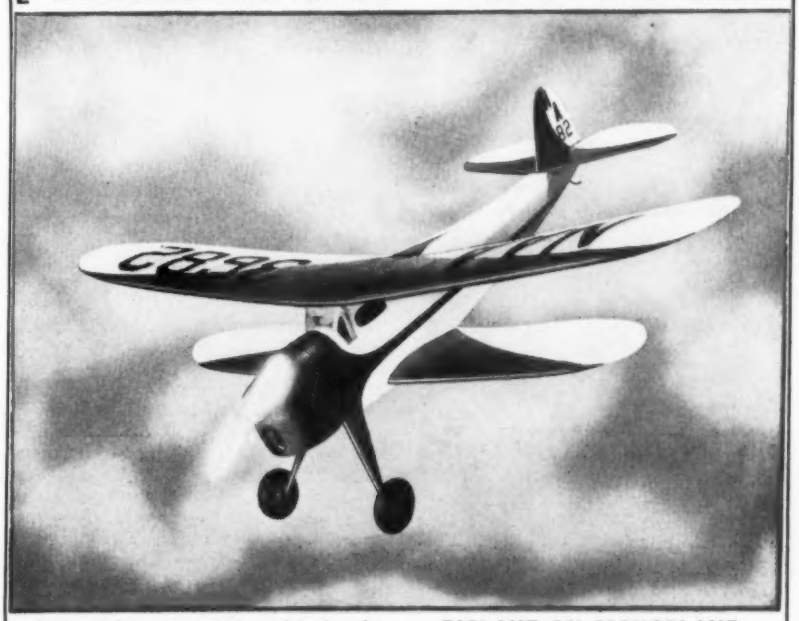
(Continued from page 9)

Models of even moderately high power should be adjusted to fly against the torque to the right. Attempts to circle to the left with the torque will result in the model rolling into the ground under power. It is important to keep in mind the effectiveness of the different surfaces under varying flight conditions. The rudder gives more effective control than the wing, due to the prop stream. This condition reverses in the glide.

The type of flight proved to be the best is the tight spiral climb to the right under power and a left circle in the glide. The tight spiral climb yields more altitude because the model travels a shorter distance for a given height. High power enables the model to hang on the prop and go up at an angle of fifty to seventy-five degrees. Therefore energy would be wasted to make the model turn in broad circles. Remember the shortest distance between two points is a straight line. So the tighter the spiral climb you get the closer you approximate a straight line.

To obtain the above suggested type of flight the following adjustments are used: Right rudder and thrust line set to the

THE HUMMING BIRD—TOPS 'EM ALL!



Designed by a top notch model champion. Engineered and styled by aeronautical engineers. A Sensational Performer. The Humming Bird will give you that contest winning climb and long flat thermal catching glide.

DOUBLE VALUE

For any small bore engine

- The Humming Bird is the only model designed to fly as a BIPLANE or MONOPLANE.
- Removable nose—a rare feature; Engine, coil & batteries mounted in one instantly detachable unit.
- Ready cut ribs—Semi-carved propeller. Generous quantities of dope and cement. Super lite bamboo paper.
- M & M pneumatic wheels.
- 39" wingspan—18 oz. ready to fly.

BIPLANE ON MONOPLANE

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EXHAUST MANIFOLD

STREAMLINED, SUPERB, SLICK

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Fits all Models of Brown Jr. and Mighty Midget engines

Our brand new streamlined exhaust manifold, made of gleaming polished brass, will enhance the appearance of your gas model; will prevent greasy, oily ships and spoiled paint jobs, by throwing the exhaust clear of the ship. Now you can cowl the engine.

SMALL BORE MOTORS

We have them all!

Ohlsson "23" ⅛" Bo.—¾" Str. Terrific Power $16.50

Bantam	$16.50	Bee	12.50
Brat	$16.50	M. & M.	17.50
Husky	12.50	Trojan	18.50
Pee-Wee	14.50	Elf	21.50

Send 5c for Complete Gas Catalogue

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With every $4.00 order or over, we will give absolutely free 1 pair 3½" valveless pneumatic wheels. These wheels are listed at $1.50.

For limited time only!

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Wood can be had in Spruce, Bass or Balsa at the same price as those listed below.

BALSA 5 Ft. Lengths

1/16x¼ ....4 for .10
1/16x½ ....3 for .14
1/16x1 .....2 for .15
1/16x3/16 8 for .25
3/16x1/8 2 for .10
3/16x1 2 for .19
1/8x¼ ....6 for .25
1/8x½ ....4 for .25
1/8x1 .....3 for .25
3/8x⅛ ....3 for .25
3/8x½ ....3 for .27
½x1 .....1 for .18
1x1 .....1 for .25

SHEET BALSA 36" Lengths

1/16x2 ..... .04
3/32x2 ..... .05
⅛x2 ..... .05
¼x2 ..... .09
for 3" stock, double 2" Price.

CEMENT

4 oz. ..... .18
8 oz. ..... .35
1 pt. ..... .60

BRASS ANGLES

¼x¼ ..... ft. .25

STREAMLINED ALUM. TUBING

¼x⅜ ..... ft. 15c
5/16x5/32 ft. 16
⅜x3/16 ....ft. 18

SPARK Coil 1.50

GAS FUNNEL with strainer .30

FLIGHT TIMER 50 Sec. ..... .50
0 Sec. to 1 M. 2.00

DURALTUBING

⅛ dia. .....ft. .14
5/16 dia. ..ft. .20
Dope, Paper Adhesive, Colored Dope same prices as cement.

BAMBOO PAPER

24"x36", 1 sheet..... .05

SPECIAL JAP SILK

A strong, light silk imported specially for gas models.
Grade A, 1 yd. .40

HARDWOOD PROPS FOR GAS MODELS

12" or 14" ea. .90
15" or 16" ea. 1.15

SPRING STEEL WIRE

1/16 dia. 5 ft. .15
3/32 dia. 5 ft. .15
⅛ dia. 5 ft. .25

OHLSSON AIR WHEELS

3½" pr.....$1.50
4½" pr..... 1.75

M & M AIR WHEELS

3¼" pr.....$1.50
3½" pr..... 2.50
4½" pr..... 2.75

DURALANGLES

⅛x½ per ft. .15
¾x¾ per ft. .22

SPARK PLUGS Brown Jr. Plugs

A needle point plug for engines. Recommended for bulky motors especially.
Each..... .65

CHAMPION PLUGS

Each..... .65

REGULAR PLUGS and JACKS

Extra small—wt. ¼ oz.
Per set of 4 .25

CONDENSERS Special gas model condensers.

1¼" long, 1 for .25
1¼" long, 1 for .25

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This book contains more than 80 detail plans of both gas and rubber powered models.
Price $1.00 P.P.

RUBBER POWERED SPECIALS

18" BALSA

1/16x1/16 100—5c
1/16x¼ 35—5c
1/16x3/16 18—5c
3/32x3/32 30—5c
⅛x⅛ 30—5c
⅛x¼ 10—5c
3/16x3/16 8—5c
¼x¼ 6—5c
¼x⅜ 3—5c

18" SHEETS

1/64x2 4—10c
1/32x2 8—10c
1/16x2 8—10c
3/32x2 7—10c
⅛x2 " 6—10c
3/16x2 3— 9c
¼x2 3—10c

PROP BLOCKS

1½x⅞x6 6—5c
⅝x1x8 3—5c
3¼x1¼x10 3c ea.
3¼x1¼x12 3c ea.

18" PLANKS

1x1 5c; 1½x2 6c
1x1¼ 9c; 1x2 10c
1x3 15c; 2x2 18c
2x3 23c; 2x6 39c
3x3 40c; 3x6 75c
3" sheets or 36" lengths, double above prices; add 10c for pkge. charge for 36" lengths.

BAMBOO

1/16 sq.x14 35 for 5c
1/16x¼x11 1 doz. for 8c

COLORLESS CEMENT

1 oz. 5c; 2 oz. 9c
4 oz. 16; 1 pt. 50
Clear dope, banana oil, thinner, same price as cement.

COLORED DOPE

White, yellow, orange, blue, red, green, olive drab, black, silver, gold or gray.
1 oz. 6; 2 oz. 10
4 oz. 19; 1 pt. 65

HIGH GLOSS

1 oz. 9; 2 oz. 16
4 oz. for 28c

MICRO-FILM

1 oz. 15; 2 oz. 25
4 oz. 40c

WOOD FILLER

Same price as Micro-Film.

TISSUE, AA

All col., doz. 19c
Superfine, white, 1 doz. 15c

BUSHINGS

1/16—4 for 1c

WHEELS per pair

	Brch	Blsa	Cel
¼"	.01	.03	
⅜"	.02	.04	.05
½"	.03	.05	.07
13/16"	.04	.08	.10
1⅞"	.07	.10	.16
3"	.15	.15	.30

ALUM. TUBING

1/16, 3/32, 1 ft. 8
1 ft., 7c
3/16, ¼ in., 1 ft., 10c

PROPELLERS

Balsa	Paulownia
Mach Cut	
5"— 4c	10c
6"— 5c	15c
7"— 6c	20c
8"— 7c	25c
9"— 8c	30c
10"— 8c	35c
12"—10c	45c
14"—14c	
15"—15c	60c

RUBBER

.045, 25 ft. 5c
1/16 sq. 15 ft. 5c
⅛ flat 15 ft. 5c
Skein for 50c
3/16, 10 ft.. 5c

WASHERS

1 doz. ⅛ or ¼ 1c

THRUST BEARINGS

Small, 1 doz. 10c

MOTOR TRADE-IN OFFER—Send your motor or a description of your motor for best appraisal offer. **HOW TO ORDER**—No orders under 50c. Add 15c to orders under $1.50. Add 10c to orders over $1.50. Add 20c for 5 ft. lengths.

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BROOKLYN NEW YORK

right. The right thrust line helps overcome torque and aids the rudder in turning the model. This is not complete however, as these adjustments alone would make the model roll in to the right under initial power. So, to counteract this roll we must have more lift on the right wing. One solution to this is to give the right panel more incidence or wash-in. This method however involves delicate warping which is very unreliable and tricky. A simple solution is to set the wing askew with the right wing further forward a slight amount. This gives the desired results in an easy manner. After the correct amount of offset is found it may always be reset by measurring, whereas wash-in is very difficult to measure.

After the power is exhausted the effect of the offset wing overcomes that of the right turn in the rudder, which results in a figure eight at the peak of the climb. The left turn in the glide should also be of small diameter. The reason for this is to encourage the model to stay in the center of a rising thermal current. Often times this will result in flights similar to Wally Simmers' seventeen minute stick tractor flight at the 1937 Mississippi Valley Meet. The model stayed in sight over the field for the entire time without getting out of the riser.

The most common adjustment used on a model is the tilting of the propeller down into so-called "down-thrust." Although not always necessary, it is invaluable in preventing a stall under the initial power burst. When a model is released it is under maximum power and travels at a maximum speed. Therefore if the model has a high point of resistance, the tendency will be to pull up at a very steep angle and stall. However the negative aligned propeller adds a downward pull on the nose which counteracts this force, and results in a normal flight attitude. As the power decreases, the downward pull on the nose decreases and so does the action of the high line of resistance. A model of low center of gravity and low line of resistance requires less down-thrust than one of higher points. When testing a model it is advisable to keep adding small wedges on the corners of the nose plug until the necessary downward and right thrust is obtained. Pieces of book matches or strips of hard balsa will work well.

The use of the folding propeller will greatly improve the gliding characteristics of a model. How it simplifies adjustment and improves the glide will be discussed at length in the near future.

Although launching procedure may seem very immaterial, it is the source of many a crack-up. For hand-launching, stick or fuselage models the following procedure is recommended: Hold the model with a propeller tip in one hand and the other about some firm portion of the rear of the fuselage. It should be launched at an angle approximating that of the normal climb and at the same speed as normal flight. Do not bank the model, let it assume its natural turning bank. It should be launched at an angle of approximately twenty-five degrees to the left of the wind. This allows the model to be headed directly into the wind a few seconds after launching, when it has assumed its equilibrium. Always be careful to keep away from bystanders. Their safety and the safety of your model depends upon it.

When launching R.O.G. you can give the model no assistance. Set the ship on the ground at about twenty-five degrees to the left of the wind and release the propeller a fraction of a second before releasing hold of the ship. Care again must be taken that no obstructions are in the way, either in front or behind you. Here is where familiarity with your model, in knowing just how it will perform after releasing, is invaluable.

Winding rubber motors is an art which can only be learned after long practice. It is important to get the feel of the rubber in order to pack in all available turns. First you must have good rubber; brown if possible. It must be aged properly for best results. Freshly-made rubber should be aged about three weeks in the air but not in a lighted place. Then it should be packed in an air-tight, light-tight container until used. The motors should be made up a day ahead of time and lubricated in order to allow the lube to soak in. Good lubricant that does not dry out too quickly should be used.

In order to get the best results easily and safely, a few precautions should be taken in the construction of your model. Use sufficiently heavy wire covered with rubber tubing for hooks. This not only gives you a sturdy job that will not bend out of line under power but also prevents the wire from cutting through the motors. No. 63 wire should be used on the large models, such as the ones that come under the Wakefield classification. The "S" hooks should have loops of sufficient diameter, that in addition to holding the rubber they should accommodate a finger so that when transferring the rubber from the winder to the propeller or tail, a firm grip may be had to keep the rubber from slipping. You can't hold a heavy motor by putting your finger around it, you must put your finger through it.

Have a helper who's not afraid to brace his feet and hold on to the model without worrying about breakage. The average model flier gets only about 60% of the available power from his rubber. Why carry three ounces of rubber in your model when you use only the power of 1.8 ounces? Keep the motor strands untangled and well-lubed.

Stretch the motor to FOUR times its normal length and gradually walk back until its stretched FIVE times its normal length, winding as you stretch that remaining length. Stay at this length until 50% of the available turns are stored. Then gradually walk in until the normal length is reached when 92% of the maximum power is in. Leave 8% for safety because when maximum power and winds are stored any delay in launching may fatigue the rubber and cause it to break.

A good winder may be made from a four to one ratio hand-drill. A nail inserted deep in the chuck and tightened in will hold well. Keep your winder well oiled and don't drop it.

Now for a bit of philosophy. As you probably know, flying a model is far from a one man job. So when flying remember: help the other fellow and he will be only too glad to help you in return. We fly for sport and believe in "One for all, all for one, and may the best man win."

How to Build a Universal One Wheeler

(Continued from page 11)

structing the rest of the tail sections. The bent strips will assume a natural curve. In building the elevator, first do the bottom, which is straight.

Wing

Oll the stock is labeled. The wing outline is a double-ellipse which is highly streamlined. The front minor axis is three inches at the center, and the back minor axis is seven inches, thus giving the root chord of ten inches. Or else, the draw-

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Denny Exhaust Manifold, fits Trojan, Brat, Brown Jr. & Mighty Midget.....$ .75
Spinner Nuts, large..... .45
small ..... .40
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No. 9-G, 3", per pair 1.25

Denny Airwheels

Exclusive, patented features, Inflated, deflated at will, Patented ball check valve and adapter. 2½-inch, $1.25 pr. 3½-inch, $1.50 pr. 4½-inch, $1.75 pr.

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DENNY JR. Gas Model, complete with Radial Cowl, airwheels, cut out ribs, finished propeller, etc.....$ 9.50
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DeLuxe DENNY JR., same in design but with finished metal parts, 4½" airwheels $12.50
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Standard . . . . . $15.85 does not include DeLuxe mounts, spring choke and down draft exhaust. Same construction as DeLuxe.

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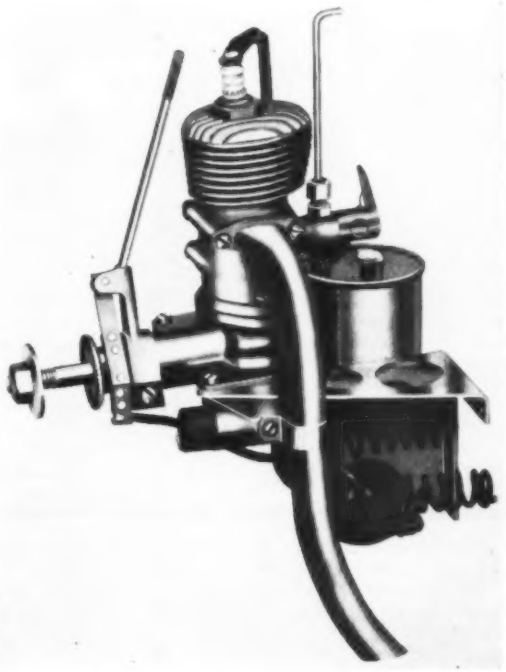

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ings may be scaled up to four times the size of those on the page by means of dividers or proportional dividers which would save time.

To cut the ribs, note that they are all derived from the root rib. As the ribs get shorter, they are decreased from the trailing edge, but they must always taper to 5/32" at the back, which is the trailing edge thickness. The wood that is removed is always taken away from the top and at the back, never at the bottom. The drawing at the top of plate two illustrates this method exactly. This system provides a negative angle at the tips, approaching a symmetrical section which offsets stalling tendencies.

The method of putting diedral into the wing is clearly outlined in the top and bottom center of plate one. This type of dihedral not only enhances the appearance of the wing but provides a much smoother airflow, especially at the tips.

Flying

It is highly recommended that the model be absolutely complete before any sort of testing is undertaken. The model should balance when held by the extreme tips.

The plane should be tested on a calm evening in a large field. The model should be pushed along the ground by the tail till it lifts a few feet and then glides in gently. If a small motor is used, give it about half-throttle and push it off the ground gently into the wind. The climb should be slow and with the torque, For better flights "rev" up the motor.

For big motors, set the spark to neutral, lean the mixture and close the choke about half then launch the ship the same as with a small motor. With big motors and at this power the model should nose up steeply with torque and climb. The glide on both ships should be flat and slow, and against torque. The skids should keep the model in an upright position. Due to the one wheel on the nose the prop toll is at a minimum, as is the parasite resistance.

Inquiries, accompanied by a self-addressed stamped envelope, should be sent to the writer care of MODEL AIRPLANE NEWS.

The Mass Production of Flying Forces

(Continued from page 7)

are very nearly twenty-five hundred military machines in Germany at the present.

The sixteen hundred machines in service in 1936 were divided into: six hundred heavy bombers (Germany is relying on the bombing plane as the most powerful weapon of both defense and offense), two hundred observation and light bombing machines and two hundred pursuit planes. This division provides a first line force of one thousand combat machines, with six hundred reserve and training machines.

Now to get back to the German aircraft production program. Gen. Goering is in absolute authority over all military aircraft construction and, in turn, over all raw materials used in their production.

"PROFESSOR" KITS PIONEER 2 NEW FEATURES

50" JUNIOR MODEL FOR POPULAR 1/5 HP ENGINES GIVE AMAZING STRAIGHT-UP CLIMB — NEW STREAMLINED MONO-WHEEL LANDING GEAR — LESS DRAG — FLATTER GLIDES — BETTER LANDINGS

(Conventional two-wheel landing gear also included for those who prefer it)

Motors may be upright or inverted

SPECIFICATIONS
—3 Sizes to Choose From—

	JUNIOR	SENIOR	SUPER SENIOR
Span	50"	6 ft-1"	9 ft-2"
Length	41"	57¼"	87½"
Wing Area, sq. Ft.	2¼"	4¾"	10¾"
Weight, complete	21 oz.	39 oz.	6lb. 5 oz.
Motor H.P.	Smallest to ⅛ H.P.		1/6 to ½
KIT PRICE complete less motor and wheels	$4.45	$4.95	$14.50
Price with airwheels	$4.95	$6.50	$16.25
Add postage and handling (unless bought from dealer)	20c	25c	50c

EASIER TO FLY—Special (only on Korff Kits) slow stalling wing tips (NACA 6412 airfoil)—Approx. 8 oz./sq. ft. wing loading—Low center of lateral area in line with center of gravity—high line of thrust.
MORE EFFICIENT—Fuselage of elliptical cross-section—expertly streamlined—elliptical planform wing—NACA 4512 airfoil (soaring section)—Low drag motor cowl—Special "T" section tail surfaces eliminates "blanketing effects."
PRACTICALLY CRASH PROOF—New type free-swinging, detachable wing. Soft balsa nose spinner protects motor—Flexible landing gear.
EASIER TO BUILD—Greatly simplified methods of construction—Many finished parts—Easy to read, full size plans—fully illustrated notes and details.
KITS ARE COMPLETE—Cutout and notched ribs, wing tips, and formers;—turned balsa spinner for propeller;—all strip and sheet balsa cut to size and of finest quality;—plenty of material for battery box, motor mount, and other details;—landing gear and tail skid wire;—wheels;—celluloid for windshield;—wiring;—hardware;—bamboo paper;—cement;—clear and colored dopes;—Easy to understand, full size drawings, clearly illustrated.
PLUS—"*Testing Gas Models and Stability Facts*" written by an Aeronautical Engineer.

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He also directs the type of production which each factory is permitted to engage in. Of the original seventeen factories there are now only eleven, and they are consolidations of the others.

The methods used by the German Government to stimulate aircraft production are original. An authorized firm is given orders to develop a new plane, together with sufficient funds to design and construct the machine. After a thorough testing, the successful new model is put into production and the same firm receives a contract to build ten to twelve similar machines. These in turn are tested and if they live up to expectations the model is taken from the authorized firm and given to a factory whose work is simply the production of aircraft. All jigs, special tools and trained workmen go to the production factory, where great numbers of the model are constructed. Under this system maximum production is assured with the least waste of materials.

The most extensive German production plant is the Junkers factory, located at Dessau. This plant employs fifteen thousand workers, or approximately one-quarter of the entire aircraft workers in the country. The capacity production of one machine, under the production plan outlined above, is one thousand machines per month! This high scale production figure is no fancy of the imagination, for the factory is so organized that capacity production can begin within very short notice.

It can be seen that the production of military aircraft has become a science in Germany. The German military aircraft industry has been greatly developed, until it is now capable of producing high performance machines in capacity quantities at extremely short notice.

At the present, there are approximately two thousand military pilots in the German Air Force, excluding all under training. In addition to these pilots and cadets under training, Gen. Goering has a huge number of civil pilots to draw upon. But Goering places the reliance of the German nation not upon the military and civil pilots. It is in the German youth that the future of Germany lies. To this end an amalgamation of all flying, sport and club associations of Germany, which had a passive or active interest in aviation, has been formed under the name of the Air Sport Union. Through this Union the youth of Germany are being systematically educated to airmindedness.

The German youth begins his aviation education at the age of ten years, when he joins an Aircraft Modelmaking Association, where he remains until he attains the age of fourteen years. If he still remains interested in aviation and his work and physique are acceptable, he passes into an Air Sport Troop. Here he must attend workshop or theoretical instruction one evening each week, in addition to another night in which he receives his political training. Four Saturdays each month are spent in physical training, in the workshop, or at the airdrome. Also, two Sundays each month must be spent; one at shooting and the other at the airdrome. On reaching his eighteenth birthday, he is eligible to join the Air Sport Union. If accepted, he will devote his activities to gliding and sailplaning. He will have to pay a fee for this; but the fee is graded according to the wealth of the youth, so that even the poorest may take part without incurring excessive expense. Others, who show superior ability will be permitted to take part in motored flight. The best of these motored pilots will be permitted to join the German Air Force. First claim on conscripts who are members of the Air Sport Union, workers in aircraft factories, or employees of the Lufthansa, which is the amalgamation of all German commercial aviation, is given the German Air Force.

Due to this well-planned program, Germany has an unlimited number of reserve airmen for her air force.

Great Britain's new air power program shows how the British are attempting to solve the production problem. The main difficulty of the British program is that the military aircraft industry is incapable of high enough production to meet even the peace time requirements of the program. In the past, the British Government neglected to aid or encourage this important industry, and so there are very few efficient military factories, and those small in existence. The private aircraft industry is entirely incapable of producing military aircraft, and the shortage of trained aircraftsmen is very apparent. Great Britain is attempting to turn a small industry into a major one overnight. Last year Great Britain produced only five hundred and seventy military aircraft. This speeding up of the industry is not successful, as she is now finding out, for the production is much below the requirements of her program, and the quality of the aircraft produced under pressure is not as high as desired.

There are eleven military aircraft factories upon the British Government's approved list. These factories are capable of producing approximately ten military machines per day. Under the expansion program of the Government, the production has been forced to seventy-five aircraft per week. Thus, the British are producing approximately three hundred aircraft per month, if we are to believe the official figures. But, actually, the production has not reached this figure, mainly due to altered designs of unsatisfactory machines and technical improvements added to machines under production.

The British Government has adopted a decided policy against nationalization of the military aircraft industry. After eighteen years of experimentation, the Royal Aircraft Establishment, at Farnborough, has succeeded in producing only one acceptable machine. This was the Queen Bee type, which is used in anti-aircraft target practice.

In addition, the government has cut most of the red tape and set new methods for the procurement of military machines. The idea being, that the sooner a successful machine is accepted and put into production, the more modern will be the aircraft of the Royal Air Force. The system is simple; the Government announces that it will need a specified type of plane

at a certain time, and the factories design and build a machine about the desired specifications. A competition is held at the time stated and the best machine is accepted.

But, the Air Ministry is at present working on another plan of production. This production scheme, primarily a wartime plan, was suggested by a civilian and it is better than any similar one to be suggested by a government official. This plan is that large firms engaged in the manufacture of mechanical products, preferably automobiles, such as the Austin and Morris concerns, are to be so organized and financed that they would be able to change over to the production of military aircraft at a moment's notice. For example, the steel presses and jigs used for the manufacture of automobiles would be replaced by presses and jigs used in the manufacture of metal aircraft wings. Metal working divisions would weld the fuselages and fittings of aircraft, and automobile engine manufacturers would turn to the production of aircraft engines. Designs, special jigs and machines for the type of production to be undertaken would be supplied to each firm. At very short notice, these firms could begin to produce first class military aircraft. This plan is under consideration, and details concerning it are being kept secret.

Under the expansion program, the Royal Air Force will have five thousand regular military pilots by the end of 1938. The reserve squadrons will be increased, and a number of new ones will be formed among the schools and universities. The man accepted for the Reserve Branch of the Royal Air Force is taught to fly at the expense of the government. Upon completion of the course, he is given a retainer fee of about one hundred and fifty dollars per year. In case of war, he will be posted for active service in a regular squadron.

The Auxiliary Air Force is similar to the Reserve. This auxiliary force is in charge of the County Associations, and each squadron is a voluntary effort of the city or county it represents. All equipment is provided by the Royal Air Force.

Permanent commissions in the Royal Air Force are generally given to honor graduates of English Universities. The cadet is sent to the Royal Air Force College, at Cranwell, where he receives two years of training. He is then graduated as a fully qualified pilot and officer, and assigned to the Royal Air Force. Last year, one thousand four hundred airmen were trained by Great Britain, and this year two thousand six hundred airmen are to be trained.

These two examples of preparation and foresight on the part of Germany and Great Britain lead to the conclusion that there must be complete organization practiced before a wartime production schedule may be maintained successfully.

Great Britain has not been able, as yet, to attain the output of aircraft which her expansion program calls for. It is expected that due to the necessities of organization, it will be some time before Great Britain can supply the required military aircraft in large numbers.

Germany fully realizes the problems of production, more so than any other nation. As a result, the German production program of peace time is the most efficient and successful of all the major nations. The fact that this peace time program may be expanded overnight, with little or no reorganization, into a huge productive wartime program, makes the present program all the more successful.

It is through peace time production schedules that emergency production possibilities may be visualized.

Air Ways

(Continued from page 31)

Willis Brown of Boston, Mass. Old model builders undoubtedly remember Captain Brown; at one time he was model head of the Junior Aviation League of Boston, which is one of the largest and oldest model clubs in the country. Recently business duties have prevented Capt. Brown from participating more actively in the model business. Nevertheless he has not gotten over the model airplane fever entirely and this spring produced the little ship shown in the picture.

★

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Power your model plane with the ATWOOD "Phantom" and get the greatest possible performance under every flying condition.

This is the *only* engine with Dowmetal magnesium alloy crankcase, which is four times lighter than castings used on other engines, and which is fitted with a hardened steel timing cam guaranteed to outwear the engine itself! And this is the only engine built and approved by famous Bill Atwood—recognized for 12 years as the outstanding designer, builder and racer of model airplanes and engines. He KNOWS.

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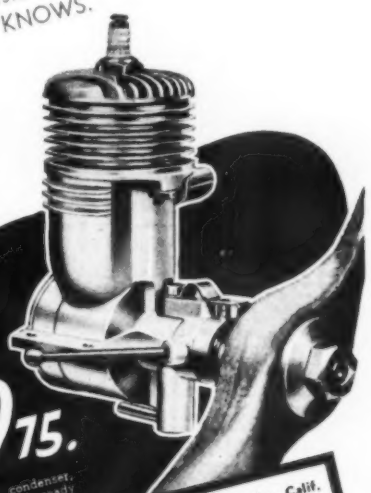

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Includes engine, coil, condenser, and tank mounted on skids ready to run. Factory run-in, tested and guaranteed.

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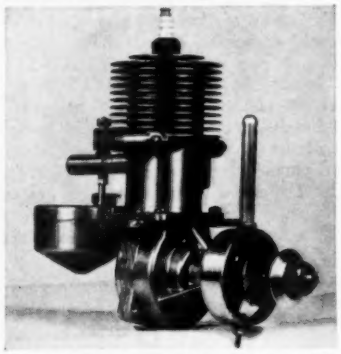

Of original, most modern design, best materials, finest workmanship, consistent winning performances, plus a reliable manufacturer, add up to make the FORSTER motor the outstanding Power Plant, the choice of champions.

Mr. Carl Goldberg's FORSTER powered 4½ foot span ship won first place on June 12 in a contest limited to ships of 4½ foot span or less,—Mr. E. C. Wasman flies Radio Controlled ships, weighing up to fifteen pounds, powered by FORSTER.

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Travis Multi-Flex Bearing with Free Wheeling Clutch

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One of the smoothest operating and most dependable Free Wheelings ever yet offered, plus—

1 Bearing is mounted in universal "Floating Power" support. Is light in weight.
2 Completely disengages motor from shaft.
3 Is positive. No springs or bulky parts.
4 Shaft is rigid on prop. Prop does not spin on shaft.
5 Clutch is to rear of bearing.

Travis Multi-Flex Bearing with Free Wheeling Clutch **50c**
T.M.-F.B. without Free Wheeling Clutch **25c**

Prices apply to style for use on motor stick model or nose plug type for fuselage. Specify whether for motor stick or fuselage model.

TRAVIS MODEL AIRPLANE COMPANY
Colorado Springs, Colorado

Jim Frick of 1843 Wood Avenue, Kansas City, Kansas, sends us picture No. 5, which shows him with his Grant Wakefield model and another smaller fuselage job which flies very well. Frick says that the Wakefield ship has turned in some excellent flights and has obtained the fifteen-to-one glide which was claimed for it.

A number of fans have built this Wakefield plane, we hear. Since it was published in the magazine, however, experiments have been made with it by Felix Gutmann, the builder, and Mr. Grant, the designer. It was found that the model has a tendency to fly a straight course because of it being over-stable—It was designed primarily for efficiency and stability combined. Inasmuch as it is necessary for a duration model to circle to the left in consecutive circles, it was found expedient to cut away about half the fin below the stabilizer and add this area, together with ten square inches more, to the fin above the stabilizer. If builders will make this change on their model superior results will be obtained. Another thing which will increase the flight duration of this ship is the replacement of the sixteen inch propeller with an eighteen inch one.

The Denny contest has caused considerable interest and excitement among model fans and many have been waiting to hear the results. Picture No. 6 shows four first-prize winners. These winners received $150 each as their award. They are as follows:

A. Labuzeta, builder of a "Starling," 191 Blakeslee Street, Rochester, New York; O. R. Leslie, a "Skylark," 2841 West Eighth, Los Angeles, Calif.; Gordon Jackman, "Condor," 410 Walnut, Little Rock, Arkansas; Charles Blietner, a "Bullet," 3149 Shanandoah, St. Louis, Missouri.

Second place winners, who received $50 each, were:

Elbert J. Weathers, a "Starling," 2720 Poinsettia Drive, San Diego, Calif.; Roger Jensen, a "Skylark," 5112 Harold Way, Hollywood, Calif.; Tom Engelman, a "Condor," 2459 Heliotrope, Santa Ana, Calif.; Richard L. Crawford, a "Bullet," 460 North Palm, Burbank, Calif.

Well over 100 beautifully built and finished models were submitted as entries. By far the best flier was the "Starling" submitted by A. Labuzeta.

CLUB NEWS

Minneapolis

Mr. Bertram Pond of 5433 2nd Avenue South, Minneapolis, Minnesota, sends us news of activities in this vicinity:

"The new Minneapolis Model Aero Club, with practically no veteran model fliers, has in a short time produced some good material, judging by the results of the Detroit Nationals. Of all the hundreds of entries in the Detroit Nationals, a new club team grabbed off six enviable positions amongst the winners; including a 1st place, 3rd place and 4th place as follows:

Outdoor Stick Model Event (Open Class)
1st place—Conrad Renning—5 min., 26 sec.

Power Model Event (Senior Class)
3rd place—Bob Toft—6 min., 10 sec.
4th place—Bob Apgar—4 min., 23 sec.

"In the International Wakefield Elimination contest, Francis Kosanda won 1st place—in the alternate division—making him 7th in the event. A 3 min., 1 sec. average wasn't so bad, and Kosanda is already tuning up his models in preparation for landing in the first six divisions at next year's Nationals.

"There were still quite a number of boys who would have been glad to swap places with the 'double threat men,' Apgar and Toft, in the Outdoor Cabin Fuselage Event. Apgar made a flight of 9 min., 23 sec., and Toft a flight of 4 min., 48 sec. Apgar and Toft, from the looks of things, are pretty consistent model fliers.

"The boys on the team all state that they had a wonderful time at the Nationals, enjoyed the hospitality, the river 'cruise,' and all those things which those who were at the contest enjoyed so much, and the rest of you missed.

"Not content with the laurels they won at the Nationals, Kosanda and Renning tuned up their National contest models to win first places respectively in the Outdoor Cabin and Stick Model events in a big Minneapolis Model Contest, held shortly after they returned home.

"More contests are to be held in Minneapolis, including a state-wide meet, for which a number of contestants are expected from Duluth, St. Cloud, Hibbing and other Minnesota cities. Those model builders and fliers in the northwest interested in keeping in touch with the Minneapolis Model Aero Club and contest activities in the twin cities should write to the Secretary of the Minneapolis Model Aero Club, care of the Minneapolis Park Board, Minneapolis, Minnesota."

Picture No. 7 shows Conrad Renning, who won first place at the Nationals with a flight of 5 minutes, 26 seconds, in the Outdoor Stick Model Event, Open Class. In the picture Renning appears slightly puzzled. We wonder what new items he is conjuring up here.

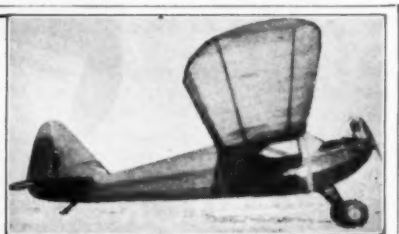
Chicago

We hear from Ed Lidgard of 8209 South Paulina, Chicago, Ill. He writes that he has been slightly startled that we put news of his club, the Chicago Aeronuts, in "Gas Lines" rather than "Air Ways;" as it is primarily a rubber model builders' club. When we receive news of gas models naturally such news is of interest to gas model builders—and therefore appears in "Gas Lines."

Lidgard says that next year the Aeronuts have agreed to take full charge of proxy-flying of the models from New Zealand which will compete in the Nationals, and returning them to their individual owners.

45"—The Thunder Bird—6'

Thunder Bird "45" wins competing against 60 large gas jobs. J. D. Raymond of Jackson, Michigan, won 2nd place at a recent meet with a "45." The model flew for 3 min. 15 sec. on a 30 sec. motor run.



Complete kit for 45" model (can be powered with any of the small bore motors) includes all necessary material—cement, dope, prop blank, shaped trailing edges, cut out ribs, etc. (minus wheels) ..... **$1.95 p.p.**
With air wheels and a finished prop, state size.... **$2.95 p.p.**

The complete 6' kit includes full size plans, prop blank, cut out ribs, shaped trailing edges, cement, dope, etc.
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With air wheels, two ½ pt. cans of colored dope and a finished prop, state size ..... **$5.95 p.p.**
Complete full size plans for either of above—25c (plus 5c post.)

Free catalog on request

NEW CYCLONE AIRCRAFT CO., Dept. A3, 166 Richards St., Brooklyn, N.Y.

New Zealanders have often expressed their thanks for the way MODEL AIRPLANE NEWS has assisted them by printing all available information.

Lidgard must be making models at a great rate, for he says that in the last three weeks he has lost three models; the first one flying out of sight after twelve minutes with only 450 winds. The second one was a Class C 7 1/4 ounce stick, and was lost after five minutes when it caught on a riser on which some hawks were riding. It caught up with the birds, outdistanced them and disappeared above.

On August 14th the Aeronuts had a free-for-all contest under NAA rules. Contestants could take as many flights as they desired, and despite a thirty mile wind many participated. The members placed in the following order: Edward Lidgard, Class C stick, 2 min., 40 sec.; Joseph Matulis, Class C. fuselage, 1 min., 53 sec., with 2/3 winds on the first flight; Dick Obarski and Marvin Setzke, Class C gliders, tied for third with 48 seconds.

Morgantown

The Kiwanis Model Airplane Club of Morgantown, West Virginia, has been quite active. On August 24th it held a meeting to plan for fall and winter activities which will embrace club meetings and several contests. A new model club has been organized at Thomas, W. Va., and those interested in joining should get in touch with Don Duncan of this city.

Kansas City

Recently the eighth annual Greater Kansas City Model Meet was held under the auspices of the local NAA Chapter, of which E. L. Hughes is president. About 200 model planes participated, and it was estimated that more than 5,000 persons were on hand to watch the performance.

Brooklyn

The fifth annual air meet of the New York Police Athletic League and The Airplane Model Builders Exchange (TAMBE) was held Saturday, Sept. 3rd, at Marine Park in Brooklyn, N.Y., with enthusiasts from the metropolitan area and New Jersey participating in the five event program for rubber powered and glider models.

The meet opened at 9:30 A.M., a new schedule of events placing the hand-launched gliders first on the program. After many of the entries had disappeared over Flatbush housetops, N. Schindelman of the Bronx was declared the winner with a time of three minutes. Alvin Felmeister of Jersey City, N.J., was second with 2 minutes, 54 seconds, with Morton Cooperman of Brooklyn, third.

A twin pusher built and flown by Isadore Schaffer of Brooklyn, won the stick event with a time of 8 minutes, 44 seconds, out of sight. Morton Kaufman of Brooklyn was second with 6 minutes, 33 seconds out of sight, and Howard Beitchman of Brooklyn was third was a six minute out of sight flight.

Gordon Murray, President of TAMBE, won the cabin event with a flight of 6 minutes, 41 seconds, out of sight. Schaffer was second in this event, with M. Singer, of Coney Island, third. Schaffer's plane did 6:02 and Singer's, 4:10.

Herb Friedlander of Brooklyn took the tow-line glider event with a 6:02 out-of-sight flight. Gus Jung was second with a flight of 4 minutes, 15 seconds and E. Powell of Jersey City third with a flight of 3:06.

The speed event was won by Jack Minassion of Long Island City whose craft covered the 120 foot course in one second flat. H. Struck, Maurice Schoenbrun and Howard Beitchman, tied for second honors with flights one-fifth of a second longer. In a tie for third were Louis Gerami, Morton Kaufman and Gus Berger.

Herb Friedlander, winner of the tow-line event, took major high point honors for the day with a total of 28 points, gained by a first, a fifth in the cabin event, a fourth in the stick event and a sixth in the hand-launched glider. Morton Kaufman was second among high scores with Jack Minassion third.

Although the meet produced several record-breaking winners, few innovations were noted among the planes entered. Folding and free-wheeling propellers were used to a great extent by all powered entries, with a few using one-blade propellers. The tow-line gliders which placed in the upper

"Bay Ridge Mike," A Winner at the Detroit Nationals

2 Min. and 50 Sec. Out of Sight

Wing Span 48" Length 32" Weight 20 ozs. with engine

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BALSA
5 Ft. Lengths

1/8x1/4 ..4 for .10
1/8x1/2 ..3 for .14
1/8x1 .....2 for .15
3/16x3/16 .....8 for .25
3/16x1/2 .....2 for .10
3/16x1 2 for .19
1/4x1/4 ..6 for .25
1/4x1/2 ..4 for .25
1/4x1 ...3 for .25
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1/4x1.....1 for .17
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.....1 for .15
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1"	.03
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1 3/4"	.07
Balsa	**Cels.**
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1 3/8" ...06	.09
1 3/4" ...09	.13

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1/16x1/4x15
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3/32x15" round bamboo 5 for .03

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1/16 dia. 3 ft. 02
1/8 dia. 3 ft....03

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1/16 dia. x 12 doz. 05
1/8 dia. 18" 4 for 05

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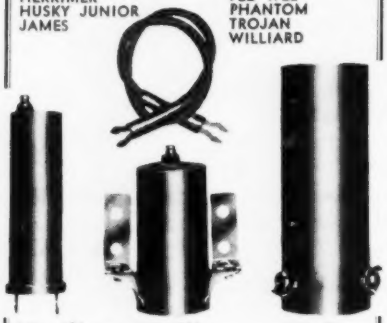

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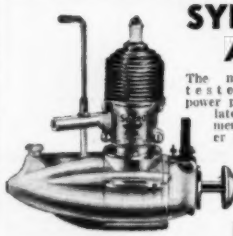

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brackets were, for the most part, quite small with wing spreads of two to three feet and featured standard balsa framework fuselages. The Friedlander winner was wrecked the night previous to the contest but was rebuilt in time to win. Speed models seemed to stress the importance of a fine finish to the craft and enough strength of fuselage to avoid buckling under power.

The Police Department was represented at the meet by Lieut. Murphy of the 63rd Precint. Dave Lynn, Director of TAMBE, acted as Flight Director for the day, with timing being done by eight recreational project directors of the W.P.A.

Prizes awarded the first place winners were a Comet Clipper Gas Kit for the Hand-Launched Glider event; a Brown, Jr. Motor for the Stick Event; a Dennymite Motor for the Cabin event; the "Flying Aces Trophy" for the Tow-line Glider event; an Imperial Gas Kit for the High Point Scorer; the Edward A. Lynn Trophy for the Speed Event and the Sears Roebuck Trophy for the P.A.L. high scorer, the latter event also being won by Herb Friedlander.

Canada

Mr. C. E. O'Reilly, secretary of the Canadian Gas Model Club, writes and tells us that the Canadian Nationals were a huge success this year. He says:

"A sweeter meet you never did see. No fuss, no bother—just business and fairly big business. The Canadian 'Nationals!' They're gone, but here's to their memory.

"Thanks to the direction of Ted Booth, honorable secretary of the Model Aircraft League of Canada, things went off smoothly with rubber and gas events mingling all day until 6 p.m. on August 30th, in the outdoor classes. An overcast sky of early morning broke up, and about noon the lads were snagging thermals. The two gas events—power shut-off and limited fuel—drew approximately seventy-five entries. In the timer event, (30 sec.) Ken Kennedy of Toronto set the pace with a flight of 4:02, followed by Ray Hunter 3:10; Jim Jensen 3:08; Doug Ireland 2:59. In the endurance class (stay-in-sight contest, we call it), Canadians bowed to the Detroit entry of Robert Wolfston, time 8:51, who survived the close competition of Doug Ireland of Edmonton, Alberta, time 8:30. I am willing to say that this ship of Ireland's had the best climb of any model ever flown at Toronto. At the end of one minute it was well up near a thousand feet!

"As a finale to the meet, the Canadian National Exhibition tendered a complimentary banquet in the Administration buildings at which George Brigden, President of the C.N.E. complimented the champions and addressed the fellows. James Jensen of Unity, Saskatchewan, was declared national champion and will receive a 47 hour flying course.

"As the banquet offered a good opportunity to find Canadian gas model builders together, a conference was held at the conclusion of festivities to get a cross-cut of opinion as to the operation of our association, the Canadian Gas Model Club, across Canada. Suggestions forwarded at a recent Toronto executive meeting were presented, and as no objections were offered, plans for the club will be laid accordingly. These suggestions were as follows:

(1) The Club should solicit the membership of only gas model builders.

(2) The Club should operate with a headquarters at Toronto.

(3) Each local club should meet in the usual way, having its own executive staff, arranging its own meetings and collecting its membership fees from each member. Such a fee is to be standard.

(4) Membership fees thus collected are to be forwarded to Toronto to authorize the mailing of all necessary pins, cards, insignia and stationery to fill the club's needs; provision being made for the local club retaining a percentage of the fee to finance minor local activity.

(5) All orders for printer's supplies, pins, etc., should be ordered in large numbers by Toronto, where dies and cuts are already owned; giving a substantial saving.

(6) Upon receipt of the shipment of pins, cards, etc., the local secretary (or treasurer) fills out membership cards he has received and gives them to his paid members.

(7) Club meetings will, as much as possible, be arranged so that they are held on the same date all across Canada—as in Toronto, on the first Friday of the month.

(8) The minutes of each local club's meeting should, each month, be mailed directly after the day of the meeting, to headquarters.

(9) Questions of national importance to gas model builders will be placed from time to time, before our whole chain of clubs, to be discussed and decided on at the current meeting all across the Dominion. Conclusions reached will be included in each club's minutes, which, when forwarded to headquarters, will accurately represent the true sentiments of Canadian builders with regard to the question involved.

(10) The data thus received from the clubs each month will be promptly edited and sent to 'Canadian Aviation Magazine,' which will if possible be made the official medium for Canadian Gas Model Club news.

(11) All correspondence should be mailed to the club's Toronto address—a Post Office box.

"Meetings in Toronto have again been resumed for the Fall and inquiries are welcome for membership from anywhere in Canada."

Results of "Nationals"

Limited Fuel

Bob Wolfston, Detroit.....8 min. 51 sec.
Doug Ireland, Edmonton.....8 min. 30 sec.
Bob Milligan, Toronto.....3 min. 57 sec.
Cliff O'Reilly, Toronto.....3 min. 37 sec.
Albert Pow, Toronto.....3 min. 10 sec.

Power Shut-off

U. B. Kennedy, Toronto.....4 min. 02 sec.
Ray Hunter, Weston.....3 min. 10 sec.
Jim Jensen, Unity, Sask.....3 min. 08 sec.
Doug Ireland, Edmonton.....2 min. 59 sec.
Bob Milligan, Toronto.....1 min. 52 sec.

Model News from Other Countries

Philippine Islands

Picture No. 8 shows a group of members of the first model club organized in the Philippines. It was started by Mr. Paterno P. Trinidad, the foremost scale model builder and one of the pioneers of model aviation in the Islands. In the pic-

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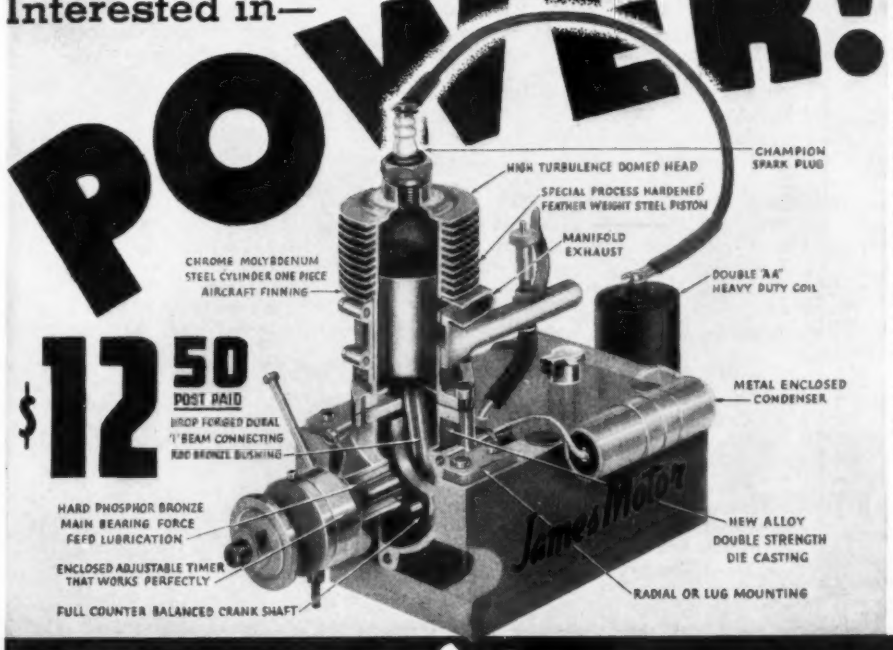
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We have achieved easy starting, low idling speed and power plus performance at high speed. Our enclosed high-speed timer will perform accurately at any speed. We have developed a high-turbulence domed head, giving greater atomization and equally distributed power to the pistons.

You can't win contests unless you have power. The James Motor has everything any other motor has, plus POWER!

We will guarantee more power, smoother running, better performance, and longer life than any other motor. Assembled and factory-tested.

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SPECIFICATIONS

Bore, 15/16"; Stroke, 15/16"; 2-Cycle; 4-Port; 1/4 Horse Power at 5000 r.p.m.; Weight Bare 8 oz.

James Motor THE GREAT WESTERN AIRPLANE COMPANY, INC. 1700 W. ADAMS. LOS ANGELES. CALIF.

ture he is seated third from the left. Mr. Trinidad studies law and edits a college paper at the moments he is not making models. The club president at the time this picture was taken was Serafin Villano (2nd from right, standing). Now they are "going in for" gas modeling and already the club boasts of three gas engines namely: a Brown and two Cyclones. However, the new members of which there are about a dozen, are still "in the 'rubber." They have four gas models two of which have flown very nicely. We are indebted for this information to Manuel T. Villanueva, Cebu City, Philippines, P.O. Box 93.

Canada

News comes to us from Al Lewis of 7 Kenneson Road, Somerville, Mass., that Wilbur Tyler and Bruno Marchi recently travelled to the Canadian Nationals and "cleaned up" in two events. Tyler made the surprising time in the Indoor Stick Model Event of 15 minutes, 26 seconds. Plans for this winning ship appear in this issue of the magazine. In the Indoor Flying Semi-Scale Event Bruno Marchi won first place for contestants over 21. His semi-scale model of an old Bleriot will appear in the December issue of MODEL AIRPLANE NEWS.

Italy

Picture No. 9 shows members of the R.U.N.A. School of Model Airplane Building of Bergamo, Italy. In Italy model airplane building is a part of the regular curriculum of the schools and is employed to make young Italians familiar with the principles of airplane design and construction. You will note that the picture shows models which embody a wide range of design. We are indebted for this information to Mr. Tinaglia Guglielmo, Via Palma il Vecchio 18, Bergamo, Italy.

England

Mr. Thomas W. Wickens of 73 Burnell Avenue, Welling, Kent, England, honorable secretary of the Kent Model Aircraft Society, sends us picture No. 10, which shows a unique twin tractor model by Mr. T. Newell. Mr. Newell won the Wakefield Cup in the first Wakefield contest ever held. Another member of the Society is Mr. H. Jones, who was a member of the Wakefield team which came to the United States in 1936. Some of the other prominent club members are: A. E. Davies, member of the 1937 Wakefield team; C. Gibson, sixth place winner in the 1936 Moffett Cup Competition; Mr. A. Levell, designer of the A.L.W. "Curlew," a full size training machine; Mr. R. Smith, holder of the British open water seaplane record with a time of 2 minutes, 28.75 seconds. The club boasts of about fifty members and most of them are expert fliers.

Mr. Wickens says at present there is a great argument going on concerning the efficiency of Wakefield models with elliptical body cross-sections versus flat-sided fuselages. He contends that he does not believe there is very much difference in the results obtained by the two types of machines at the slow speed at which the models fly. Have any of our readers any ideas on this subject? If so, perhaps they

(Continued on page 63)

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GRINDER $5.95
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Unretouched photo of the "Army Hawk"
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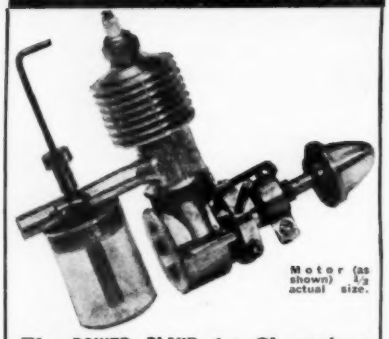

Motor (as shown) 1/2 actual size.

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A few contents of the complete kit are: Full size plans; mahogany finished hard wood propeller; large cans of cement, plain and colored dope; heavy duty inflatable airwheels; ignition equipment; more than enough special gas model balsa; ready cut ribs; etc.—$6.75. Minus airwheels—$5.50. All kits P. P. in U. S. A.

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TROJAN MINIATURE PRODUCTS CO.,
6626 Sunset Blvd., Hollywood, Calif.

Gas Lines

(Continued from page 27)

a truck, two motorcycles to retrieve models, tables, chairs, rope, scales, stopwatches and lots of personal assistance. Lt. C. L. Layne acted as one of the timers.

"The contest was held on the 4th of July and was sponsored by the Junior Chamber of Commerce of Honolulu, Recreation Commission of Honolulu and the Kellog Sales Company. The Committee consisted of A. K. Powlison, G. M. Lord, Earl Baker, Richard Lau, Ace Stromberg, Robert W. Foss, S. L. Shock, Lt. C. L. Layne, Elmer Liehman, W. B. Stoddard, Leroy Currier and St. Sgt. Cunningham. There were forty-four entrants with 2000 spectators on hand to witness the flying. The winners were:

	Winners	Age	Address
1.	Eyvinn Schoenberg	19	Waipahu
2.	Kiyoshi Onomoto	19	Honolulu
3.	Robt. Green	12	Aiea
4.	Phillip Toma	22	Honolulu
5.	George Abili	19	Honolulu
6.	Elmer Lee	33	Honolulu
7.	George Sasaki	21	Honolulu
8.	Koichi Shima	21	Wahiawa
9.	James Tsutsumi	30	Honolulu

Picture No. 15 shows a group of contestants, with their models, at the flying field.

Picture No. 16 shows the gas model which was judged the most beautiful plane at the Coupe de France contest for gas models, held last May at the Caudron aerodrome, Guyancourt, France. Unfortunately this ship cracked up on one of its flights.

It is hard enough to get a good picture of a gas model in flight, to say nothing of getting a picture of a biplane gas model. Well here is one, No. 17, which shows Burton DeMarais' biplane "winging its way across the blue." DeMarais lives at 435 South 11th East, Salt Lake City, Utah. The short span of biplanes has made the torque developed by poorly designed propellers react disastrously, on most occasions, when ships of this type have been flown. There is a real trick in designing and flying a biplane gas job—the ship must be perfectly designed. Usually designers who attempt to create this type of ship give too much pitch to their propellers, and this causes excessive torque.

Picture No. 18 shows Mr. Irwin Ohlsson of 630 North Alvarado Street, Los Angeles, Calif., explaining the virtues of one of his latest gas models to Captains "Hap" Russell and Johnny Martin, pilots of the flagship of American Air Lines. They join in with Mr. Ohlsson on many occasions to fly these little ships. This is significant of the interest being taken by many aviation veterans in this fascinating, scientific sport.

Mr. A. I. Petersen of Minden, Nebraska, writes us:

"About seven months ago the Minden Post of The American Legion took on the task of sponsoring a boys' model airplane club in this city. We started the club with twenty boys between the ages of 12 and 21, and one of our first requirements was that each boy was to build a model airplane of some kind before being eligible for membership. This gave the club some twenty planes right at the beginning, made every boy a little more interested and gave them all something to do at once. By now we have 27 members and every member is active and very interested.

"A committee of four members of The American Legion supervise the affairs of the club and no boy can become a member without this committee passing upon his membership. In this way we can keep a good check on the boys and have only members that we know will carry on in the club and are interested. The club elects its own officers and carries on its own meeting but still under the supervision of this Legion Committee. So far this plan has proven very satisfactory. We are not yet members of the National Aeronautic Association but we intend to form a Junior Chapter here this Fall, with every one of our members becoming a member of the NAA.

Type	Motor	Points
Parasol monoplane	Ohlsoon	236
High wing Cabin	Ohlsson	211.5
Cabin Monoplane	Gwinn Aero	176
High wing Mono	Gwinn Aero	167.5
Quaker Flash	Cyclone	152.5
Quaker Flash	Ohlsson	145
Cabin mono	Cyclone	142
Stand. Buccaneer	Gwinn Aero	141
High wing mono	Brown Jr.	113

"During the National Air Mail Week we put on a nice demonstration with the gas planes that the boys have; as well as displayed all our models in two local windows in the business district. The club now has about 9 working gas models and more are under construction. We have quite a group of rubber powered models and can really put on a show when necessary."

Picture No. 19 shows Mr. A. T. Petersen, who is chairman of this American Legion Model Airplane Club, holding one of the little ships built by the club members. It is an exact scale model of a Curtiss Robin.

Here we have food for a little thought. Mr. E. Morris Swedlund of 202 Eighth Street South, Moorhead, Minnesota, writes as follows:

"We now have a number of gas models in operation in this vicinity but the majority of us are opposed to joining the Gas Model Division of the NAA because of the 30-second motor run pledge which has been invoked. While the rule may apply very well to the Eastern U.S.A., it discriminates against those of us who live in small towns in the prairie states, where wide open spaces are the rule rather than the exception.

"I have a Flying Quaker weighing 5-1/2 pounds which flies quite well, but I hardly ever set my timer for less than 45 seconds. I favor a 30 to 40 second timer shut off for contests but for everyday flying such time is too short.

"I have just returned from a trip through central and western North Dakota, my native state. I have been exceedingly pleased to note the progress made and interest which is being aroused by gas powered models. In my home town, (previous to entering college here) Williston, with a population of 6000, there are now about six ships in operation with more being completed. Flights up to half an hour have been made there. In Bismark, N.D., I am

informed that there are fourteen active builders with flights up to twenty minutes recorded. While every Williston model was equipped with a timer, I was told that there was not a single timer being used in Bismark."

We will be glad to have comments from readers concerning the thirty-second motor run, and how this rule should be applied. Evidently it has many virtues, especially at contests."

Mr. John G. Lacey of 6 North Port Street, Baltimore, Maryland, treasurer of the Baltimore Gas Model Club, writes us as follows:

"We believe we recently had the largest gas model meet ever held in Balto. Mr. W. W. Saunders supervised the meet and made a real job of it. He was assisted by committeemen Myer Lahn and Walter Coburn. There were plenty of prizes; from a gold trophy to a paper weight.

The results were as follows: Theodore Schindler of Balto took first place, winning the Herbert O'Connor Trophy. Carrol Carter of Washington, D.C., placed second, taking the Burd Co.'s prize of a motor and Myer Lahn placed third, taking the Berkeley Courier Sporster Kit.

"The Balto Gas Model Club sponsored a rubber power contest for the younger boys, to stimulate interest in the building of models. Mr. Hugh Wilson supervised this rubber contest. Mr. Wilson was formerly connected with the Jr. Birdmen of America and the boys seemed right at home with him. The results were as follows: Ray Dietz, with a 9 min., 49 sec. out-of-sight flight won the Howard W. Jackson Trophy. Paul Mon was second, winning the Megow's Quaker Flash Kit. There was a great deal of interest in these events.

"Contest prizes were awarded by Captain Harry Rowland, test pilot for the Glenn L. Martin Co. of Baltimore, Md."

We are also indebted to Mr. Leonard Dorsey, president of the club, for information concerning this contest.

Just to show why there should be gas model regulation, we wish to quote an article in the "New York Herald Tribune," which had the title of: "Corrigan Flight of Model Plane Worries Town," and subtitle of: "Craft of High School 'Aviators' Must Find New Field After Wings Hit Roofs at Somerville, N.J." The text of the article is as follows:

"A Corrigan flight on a miniature scale, performed by a gasoline-powered model plane which buzzed out of the south, brushed the roofs of several buildings, zoomed across the business district and just missed a church steeple, led police today to issue an order temporarily grounding the craft and all like it.

"The flight of the model, which has a wing-spread of seven feet and a two-cylinder motor with a fuel capacity of one and one-fourth ounces, occurred on Saturday afternoon and spread consternation among store-keepers, shoppers and motorists.

"Police found the plane in a tree at West Cliff and Grove Streets, just north of the business center. They then found the owner, David Benum, sixteen, son of Nathan Benum, Somerville clothier, and member of the Aero Putt-Putts, a group of high school 'aviators.' Benum explained that he forgot to set the timing switch of the motor which cuts the power after thirty seconds, and that the wind had twisted the rudder from the position in which he had set it, thus causing the wrong-direction flight.

"Authorities, fearing that similar flights might cause personal injuries or a bad traffic accident, today ordered the Putt-Putts to abandon their use of a field south of town. The Putt-Putts indicated they would henceforth use a baseball field farther out of town and to the east."

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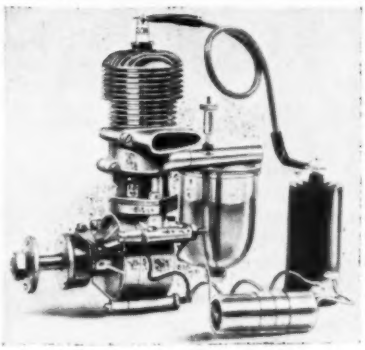

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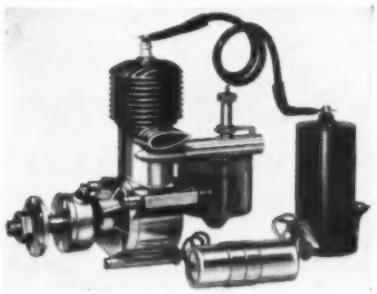

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Illinois

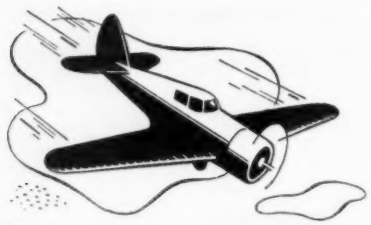
Joseph J. Lucas of Chicago, Illinois, sends us some details of the Fernwood Park Model Airplane Meet held in Chicago on August 21st.

A crowd of ten thousand people of Fernwood Park Community were given a rare treat with one of the finest model airplane contests ever staged in the city of Chicago. The audience was very enthusiastic over the meet; particularly of the wonderful flight of Joseph Matulis of 1906 S. Halsted Street. For this flight, 4 min., 30 sec., he was given a gas model kit donated by Aircraft of Chicago.

The model contest was for average duration for three official flights with any type of outdoor model; and the winners of first, second and third place of the Junior and Senior divisions were given gold, silver and bronze medals. The following are, respective, the winners of these medals.

Seniors

Irving Kovnat, 5056 Chicago Ave., average time 2 minutes, 47-6/10 seconds, gold medal; Joseph Matulis, 1906 S. Halsted



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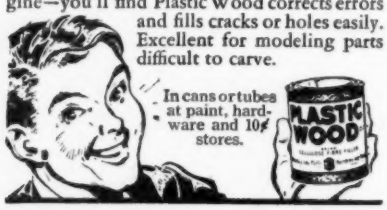

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Develops strong body and alert mind. HARMLESS. The spring-steel 3-foot-long foils (swords) are equipped with rubber buttons. Aluminum cup-shaped hand guards. Our De Luxe foils are built for hard usage.

Complete set of two foils (swords) and free instruction booklet, only $1.98. We pay postage. Two additional fencing swords FREE for limited time. (Regular price of these two sets of foils $3.96.) ORDER NOW.

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AN AMAZING NEW TYPE OF GAS MODEL

A new type of construction that is a pleasant departure from time wasting, conventional methods, coupled with a design that is refreshingly different.

This model embodies a NEW type of construction that is the acme of simplicity and strength. It can be built in half the time required by other midget gas models. Access to the motor and its accessories has been accomplished by a novel, practical method. One simple motion of the hand reveals the motor, coil, condenser, batteries and all wires. What a time saver at contest!

The flying qualities of this model are sensational. It has a steep, altitude getting climb plus a glide in still air of 20 to 1 (this glide is exceptional for a midget gas model). Experts all agree that this model possesses stability to a remarkable degree. Spiral stability has been secured by expert, professional designing.

This model is virtually crack-up proof because of its exceptional light weight, and the strength and flexibility incorporated in the design. Do to this same, careful, expert designing we are enabled to sell this model at a remarkably low price, without sacrificing the high quality of this kit. When you have built this model you will agree with us that it is the GREATEST DEVELOPMENT in GAS MODEL CONSTRUCTION in RECENT YEARS.

Kit is complete to the smallest detail, including liquids and 2½" M&M air wheels. Wing span 42". Overall length 28". Weight complete, ready to fly 17 ounces. Uses any small bore motor.

2.95 Plus 15c Postage

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St., average time 2 minues, 40-9/10 seconds, silver medal; Robt. Kaergard, 330 Warren Blvd., average time 1 minute, 44-9/10 seconds, bronze medal.

Juniors

Robt. Crowley, 7234 Harvard Ave., average time 1 minute, 36-1/10 seconds, gold medal; Robert De Batty, 7115 Union Ave., average time 1 minute, 9-3/10 seconds, silver medal; Jimmy Tangney, 770 George St., Aurora, Illinois, average time 1 minute, 6-3/10 seconds, bronze medal.

Mr. William B. Ryan of 1114 Airway, Glendale, Calif., sends us an interesting account of the Los Angeles Midget Air Race Associations' two-day meet.

A night precision flying contest was a spectacular feature of the Los Angeles Midget Air Race Association's two-day meet, September 4th and 5th, at Model Airport, Los Angeles. The duration contest, which, with the speed and precision tests comprised the principal events of the three sessions, was won by Elbert J. Weathers' camera-carrying gas model, plans for which were published in detail by MODEL AIRPLANE NEWS, (May and June, 1938). Over 400 fuselage-type models were entered in the show, which drew a crowd of over 8,000 people from all parts of Southern California.

From the spectators' standpoint, the night contest was far and above the greatest model event that has ever been staged, according to F. B. Knapton, director of the meet. Entries in the precision competition, which was held after dark, were required to carry lights, and were judged on appearance, covering and finish, construction, take-off run, landing smoothness and precision, flight attitude, altitude and novelty equipment. The winner, Dick Roe, 3812 Clarington Avenue, Culver City, Calif., flew a five-pound ship with a 77-inch wing which was equipped with retractable undercarriage and powered with a Brown Jr. He garnered 73 points out of the possible hundred.

Second place in this event went to Bud Warren, 412 Brett Street, Inglewood, Calif. His Tom Thumb-powered Bunch Scorpion, 51 inch wingspan, brought him a total of 67 points. John Berg, 1147 South Hoover Street, Los Angeles, was third with a Dennymite Airstream-powered high wing monoplane that recently took second place at San Diego. His point total was 67.

The second place winner put on an exhibition for the benefit of the 2,500 night customers when he filled his tank with a 10-minute supply of gas and turned the ship loose. Considerable excitement was caused in the crowd when the searchlights lost the little model, which later landed within the boundaries of the airport.

The duration contest was held both days of the meet, the first 200 ships taking off on Sunday. Weather's camera ship, a duplicate of which tied for third in the speed event, stayed in the air 12 minutes, 24-3/5 seconds, for the championship. Roy Lazar, of Taft, Calif., was second with a nine minute, 35 second flight. Lazar was one of three Taft Condor Club members who took the meet by storm the first day; at the end of which they had second, fourth and fifth places.

Sandy Abrenica, perennial Los Angeles model builder, was third with the same ship that he used to take second in the speed event. During the speed contest, over a measured course, this ship caught a thermal and soared for several minutes longer than the seven minutes, 23-1/5 second time he was able to get for the duration flight. John Bunch was fourth among the duration fliers, with a Gwin-powered Bunch Scorpion.

Bill Atwood, long-time Pacific Coast model flier, made two good flights with a low-winged, Phantom-powered, one-wheel model. Neither of these counted officially; as on the first his motor ran three seconds overtime, and on the second, he was merely testing the ship, which wandered into a towering pillar of rising air and landed four miles away. By the time Atwood retrieved it, the races were over. According to Bill, this is one of the first low-wing gas jobs that has ever been able to compete with the high-winged types.

The speed event, held Sunday afternoon as a sort of intermission between the two duration flights, attracted only 25 ships. Zip Grandel shot his blue Ohlsson-powered job over the 264-foot measured course at nearly fifty miles an hour to win. Abrenica's duration ship, Brown Jr. in the nose, was second. Odes McKennen, with a Dennymite powered ship of his own design, tied for third with the Weather's camera ship flown by Judson Marsden.

As in the case of all Los Angeles meets, held at Model Airport, the crowd was kept well informed of what was going on by the ingenious public address system. The success of this arrangement revolves around a field telephone, from which a model expert relays pertinent information to the central public address desk. Herb Badstrubner and Harold Ball were in charge of all public address workers.

Ships entered in all events were weighed in at the officials' stand, then sent out to the starting line where they were put in complete charge of Earl Harper, chief of operations, and Pop Mosedale, official starter.

According to contest officials, the meet was successful enough, in spite of the Labor Day triple holiday which took many prospective spectators to the mountains and beaches, to warrant repetition. Adding to "customer interest" were the presence of Reginald Denny throughout the entire meeting and Tommy Kelly, star of the moving picture, "Tom Sawyer." Various concerns contributed prizes to the winners, and the Sta-Lube Oil Company furnished automobiles in which contestants whose ships left the airport were able to follow them until they landed.

E. T. Robinson, Co. Clerk, Company 580 CCC SP-9, Broadacre, Ohio, sends a helpful hint which he wishes to pass on to other gas model builders. He says:

"I own a 1936 model Baby Cyclone motor which is minus a tension clip for the needle valve. As a result, motor vibration causes the valve to turn, thus speeding up and slowing the motor at various intervals, finally causing motor to stop. Furthermore, I broke a needle valve with my finger nearly every other time I spun the prop because the long needle valve had no support at its end and was also very close to the prop.

"The following little idea remedied both

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30 INCH WING SPAN

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10c extra for attaching shackles.

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1⅜—20c
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1⅜—20c
1⅝—25c
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BLOCKS each up to ½"
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VENTILATORS White Metal

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5/8"	5/16"	10c
11/16"	⅜"	12c
¾"	⅜"	13c
1"	½"	14c
1⅛"	½"	15c

LIFE BOATS Type A Boat with double pointed ends.
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Size	A	B	A	B
1"	8	5		
1½"	6	7	12	12
2"	9	10	15	15
2½"	10	12	18	18
3"	12	15	21	21

Dead Eyes Black or Natural All sizes same as blocks. 2c up to 1½" 2½ up to 1¾"

DAVITS for above boats 1" 10c pr. 1½" 12c pr. 2" 15c pr. 2½" 18c pr. 3" 20c pr.

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faults at once, (verbally 'killing two birds with one stone'). I put a pin-hole through a large rubber eraser and forced it over the needle valve, gluing it to the side of the motor mount; and making certain that the needle valve was in perfect alignment with the valve seat. This acted as a bushing and prevented the frequent breaking of needle valve while the friction of the rubber on the valve prevented its turning.

"The most important points to watch are to see that there is enough room between the crooked end of the valve and the eraser to allow easy adjustment of needle valve in seat, and that the needle valve is perfectly straight."

Following is a news item which we believe may prove interesting:

More than 5000 spectators, the largest crowd a model meet has ever attracted in the state, saw 150 model planes, powered with tiny gasoline engines, compete at the Curtiss-Wright airport tourney, in Milwaukee, Wisconsin.

Edwin Schunke, a draftsman, won the National Aeronautic Association Trophy with a flight of 3 minutes, 16.2 seconds. Schunke designs his planes himself and his winning red and white monoplane, which made a crashing landing at the end of its flight, is declared to be "theoretically stable"; an engineering accomplishment.

Carl Popp placed second with a time of 2 minutes, 24 seconds and Charles Vogel was third with 2 minutes, 17-1/2 seconds.

The meet was conducted by the Milwaukee junior chapter of the National Aeronautic Association. The rules allowed only those to enter who had the ability to keep their plane up in the air for 30 seconds after the take-off."

Air Ways

(Continued from page 59)

will write and tell us about them.

One of the most beautiful jobs of construction we have seen comes to us from Mr. H. F. Dare of 1 Summit Way, Southgate, London N. 14, England. It is shown in picture No. 11. It is a one inch to one foot scale model of a Miles Falcon which he recently completed. Mr. Dare says it has already won several prizes for him. He is a member of the Northern Heights Club and he would like to receive plans from any model builder for the United States Army Douglass Observation plane of the parasol type. If anyone has these plans or knows where they may be obtained, will they please communicate with him.

England

Another item from England has been sent us. Our old friend, Harry York of 171 New Kent Road, London SE 1, England, that in this year's Wakefield eliminations there were 227 entries. The final six were:

1. E. Chasteneuf.....247.583 sec.
2. R. N. Bullock.....231.2 sec.
3. F. E. Almond.....190.66 sec.
4. R. Smith.....184.0 sec.
5. H. White.....178.76 sec.
6. L. Stott.....167.6 sec.

The Bowden International Gas Model Competition was held on July 24th, just before the Wakefield Competition in France. Herbert Fish of Akron, Ohio, won the competition last year.

Japan

It appears that the sport of model airplane building has been growing with leaps and bounds in Japan. It is estimated that 20,000 persons through the empire are active followers of this sport. Most of them are primary and middle-grade boys, and in Tokyo alone there are about 2,000. Mr. Moriichi Kitamura founded and financed the Tokyo Model Airplane Association in 1925, and its membership reached more than 400 when it was dissolved in 1933. A large number of Tokyo's fans now belong to the Japan Model Plane Association or the Japanese Boys' Aeroplane Society. The latter was founded in 1927 by Count Shigenobu Okuma "to develop a knowledge of aerial navigation." It is supported by a grant of 15,000 yen made by the Imperial Household in 1932 and by an annual government subsidy of 1,000 yen.

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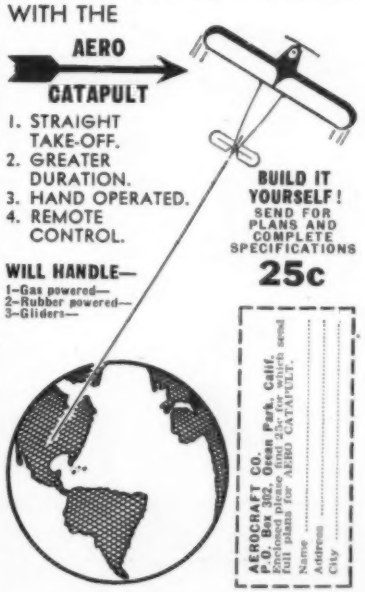

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127 120 116 films enlarged 4x6 35c complete. Send for price list and discounts on film and supplies. Star Photo, New Britain, Connecticut.

BROWN AERO RUBBER—Hodgman Rubber Company, 261 Fifth Avenue, New York City. Chicago office: 412 South Wells Street. Dealers and manufacturers only.

1938 Gwinn Aero's $9.50; other engines, wholesale price. Model Supplies, complete stock, stamp for list. Good's Models, 5 Santa Clara, Dayton, Ohio.

PROPS—Designed aerodynamically correct for any gas model. Priced from 50c to $2.00. Hi Thrust Propellers, 2133 Cypress St., Vancouver, British Columbia.

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⅛ H.P. Gasoline Motor Kit $5.00. Aluminum propeller and plans for six foot gas plane free. Send $1.00 with order, express collect for balance. Brown Junior Motors, Model D, $10.00. Mike Pozsgay, 2601 St. Louis Ave., East St. Louis, Ill.

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SEND at once for "Automatic Pilot." Fits any size model. Keep ships from stalling and diving. Test ship has over 100 flights. Plans 75c. Write "Automatic Pilot," 1200 Capital Blvd., Boise, Idaho.

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Original Design Contest

We take the greatest pleasure in awarding the prize for the most original model this month to one of our foremost German correspondent, Mr. Hans Justus Meier of Osterstr, 23, Bremen, Germany.

Picture No. 12 shows Mr. Meier holding the plane; No. 13 shows the rear view.

Mr. Meier has worked out the tail assembly in a most original manner. This idea has been put into practice before; however, on many occasions such tails have not given very good results. In the case of a "V" tail in which the stabilizer assumes the duties of the fin as well as its own, it is essential that the right dihedral angle be given to the two. Usually too little dihedral is used. In the case of Mr. Meier's plane we believe that the dihedral is slightly too great, however. The greater the dihedral, the less the horizontal effect; the less the dihedral, the less fin effect will result. A dihedral of about thirty degrees on each side usually gives the best results.

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1x1.....1 for	5c	8"	7e.....20c	½x⅛.....30	19c
1x2.....1 for	9c	9"	8e.....24c	⅛x31/16.....12	19c
2x2.....1 for	16c	10"	8e.....27c	⅛x¼.....10	19c
3x3.....1 for	22c	12"	10c.....35c	¼x¼.....6	19c
2x6.....1 for	38c	14"	14c.....X	3/16x3/16...8	19c
3x6.....1 for	72c	15"	X.....48c	¼x¼.....6	19c
NOSE BLOCKS		16"	16c.....72c	¼x½.....3	19c
1x2x1	1c	ALUM. WHEELS		⅜x⅜.....1	7c
2x2x1	2c	1" pr.	6c	½x½.....1	9c
2x2½x1	3c	1⅜" pr.	11c	Specify whether hard or soft. Add 25c pack. charge on 5 ft. lengths.	
3x3x1	4c	1⅞" pr.	14c		
3x3x2	7c	Sheet Aluminum .003.....sq. ft.	10c		
3x3x3	9c	ALUM. LEAF		DUNNY RAD. ENGINE (Celu.)	
5x5x2	24c	2 Sheets for	1c	1⅛" dia.....	.08
18" BALSA		TISSUE, AA		2" dia.	.12
1/16x1/16 100,	5c	All col., doz.	19c	2½" dia.	.14
1/16x⅛ 35 for	5c	Silver .....ea.	5c	3" dia.	.17
1/16x3/16 18,	5c	Superfine, wh.	5c	THRUST BEARINGS	
1/16x¼ 15 for	5c	CAMEL'S HAIR BRUSHES		⅛ Doz. Small 4c Large 6c	
3/32x3/32 30,	5c	Small 3c; med.	5c		
⅛x⅛ 30 for	5c	Large.....	8c	INSIGNIAS—French, American, English, German	
⅛x3/16 12 for	5c	BAMBOO PAPER 2 for 15c		1¼" .....4 for	3c
⅛x¼ 10 for	5c	Wood Veneer		2" .....each	1c
3/16x3/16 8,	5c	20x30" ....1 for	9c	2¼ and stripes	5c
¼x¼ 6 for	5c	2 for	17c	DOWELS	
¼x½ 3 for	5c	11 in. BAMBOO		1/16x6 .....doz.	5c
18" Balsa Sheets		1/16x¼ 6 for	5c	⅛x18 ....2 for	3c
1/64x2 6 for	10c	Shredded 40—5c		3/16x18 ..2 for	5c
1/32x2 9 for	10c	REED		WIRE	
1/16x2 8 for	10c	1/32 or 1/16"		.014 6 ft.	2c
3/32x2 7 for	10c	3 ft.	1c	.020 .028 6 ft.	3c
⅛x2 6 for	10c	⅛ in. .....3 ft.	2c	.034 .040 6 ft.	6c
3/16x2 3 for	8c	CEMENT CLEAR DOPE THINNER		1/16" 3 ft.	5c
¼x2 3 for	9c	1 oz. 5c, ½ pt.	30c	NOSE PLUGS,	
½x2 2 for	11c	2 oz. 8c, pint	45c	⅛".....1 doz.	5c
3" sheets or 36" lengths, double above prices; add 10c packing charge for 36" lengths.		Colored Dope		¼".....1 doz.	10c
		1 oz. 5c, ½ pt.	35c	MODEL PINS	
		2 oz. 9c		Pkg.....	5c
PROP. BLOCKS		MICROFILM		PROP. SHAFTS 2 for	1c
½x¾x5	7—5c	One oz. bottle	10c	SANDPAPER	
½x¾x6	6—5c	Sheet Celluloid		Doz. sheets	5c
⅝x1x8	3—5c	2x6—2c 6x8—4c		BOMBS	
⅝x1¼x10	2—5c	12x16.....	15c	¾"....4c 1¼"....7c	
⅝x1¼x12	3c ea.	RUBBER LUBRICANT		3".....12c	
1x1½x12	5c ea.	Large bottle	10c	GUNS WITH RING MOUNT	
1x1½x15	6c ea.	WING AND TAIL LIGHTS		1¼" 10c 1¾"	15c
1x2x18	9c ea.	5/16" 10c; 9/16"	15c	MODEL BUILDER'S KNIFE	
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Another way to look at it is that the vertical projection of the stabilizer should be equal to half of the fin area required when a normal type of fin is used. The horizontal projection should be equal to the area of the normal type stabilizer that would be used on the particular ship.

There are several advantages to this type of tail assembly. One is that it increases the stability of a model laterally as well as directionally and longitudinally. The construction also is simpler and usually a reduction of weight results.

The area of the stabilizer of Mr. Meier's plane is one hundred square inches, which is just half the area of the main plane. He says he believes this is slightly too much as the ship has a tendency to dive in gusty wind. Unquestionably he is right—the area that would result from the specifications given above would be between forty and fifty per cent of the total wing area if the normal horizontal stabilizer, when used on this ship, is 33% of the wing area.

The constructor of the original model is Mr. Liggett of England.

In our next month's issue another original design will appear.

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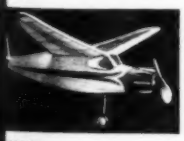

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